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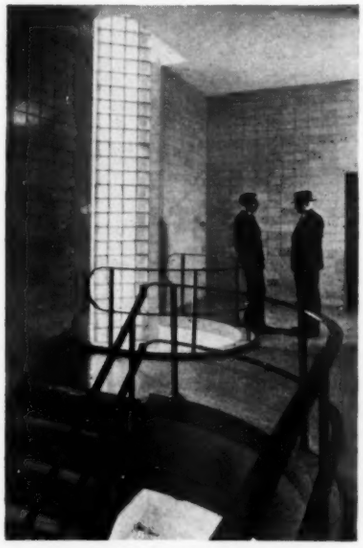

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American Machinist's paid circulation is now over 17,000 . . . even higher than in the period of peak activity in 1929.

More men pay to read American Machinist than any other metal-working paper.

Talking Shop

Dynamic Balance

The general need for some standard method of specifying allowable limits of dynamic balance in rotating parts has been called to our attention several times in the past few months. Electrical manufacturers are particularly interested in this subject, since most of the machine tool builders are specifying dynamically balanced motors for use on their equipment, but few of them have definite information from which to write specifications for balance.

One of the more important machine tool builders is finding it necessary to balance pulleys, sheaves and shafts in the machine drive. This has also been extended to the chuck bodies, scrolls and jaws of chucks and even to

chucking fixtures. Balancing machines have been fitted with adapters that simulate the spindle nose of the machine on which the fixture is to be used.

When the fixture is mounted in position and a piece is clamped in place it is possible to bring this special tooling setup into a good dynamic balance at little expense. This builder claims that balancing fixtures in this manner eliminates considerable calculation at the drafting board and permits economical production of balanced fixtures.

Antidotes to Boredom

British and American methods of combating boredom in the modern factory throw an amusing sidelight on national characteristics.

One manufacturer in this country has found that production can be increased and the spirits of the workers lightened by allowing food dispensers to travel through the plant at a certain time in the morning and afternoon when production begins to lag. A drink of Coca-Cola, a chocolate

bar or a sandwich is sufficient to tone up the American for the rest of the day.

A firm in Birmingham, England, provides three half-hour programs of music every day. Light, rhythmic music together with pauses in the morning and afternoon, when everyone and everything stops for ten minutes and a cup of tea may be taken, decreased the percentage of sickness, and increased the output in five days to equal that of the old five and one-half day week.

Silver Plating

We were recently told of a company that is silver plating small die parts before annealing or hardening, in order to eliminate scale. Since this company maintains a silver-plating bath for a part of its product which has large production requirements, the additional cost of silver plating the tool part is negligible. Parts made from air hardening and similar steels are used without removing the plating, but machine steel parts that are to be carburized are deplated to expose the surface to the carburizing materials. Tried at the suggestion of the toolroom foreman, this process has eliminated much of the difficulty previously experienced with the scaling of irregularly shaped blanking die inserts. Even if it were expensive it would still be economical.

Too Much Torch?

According to one railway shop executive the growing use of the torch in the shop is not an unmixed blessing. He says the average present day machinist calls for the torch operator to cut off a half-inch bolt or burn off a nut that is stuck. Cutting the bolt with a cold chisel or using a chisel and hammer to split a nut never seems to occur to them. This criticism, of course, is not really against the torch but rather against the training of the men, for which

management must take at least part of the blame. It reminds one of the prodigal and expensive use of compressed air to open doors, operate bench vises and copying presses when air was new and the cost not appreciated.

Salvaging Old Axles

Economical salvage is a highly desirable factor in any industry. But there are too many cases where salvage may cost more than it is worth, or the resulting product is unsatisfactory. Years ago one of the favorite "economies" in railroad shops was to make milling cutters out of old axles, carburizing and hardening the teeth. Of course they were not really economical as they were short lived and would not stand heavy cuts.

There are, however, uses to be made of present day axles that have been discarded. They can be normalized and made into crankpins or crosshead pins. Here is a field where wide awake railroad shop men have found the heavy duty turret lathe of great value. —*The Editors.*

Unionization

What does the man in the shop think about it and how is the boss going to find out what he thinks?

FRANK RISING
Labor Editor, *Business Week* and
American Machinist

BUSINESS management, which is no stranger to tough problems, is faced with one these days that taxes the ingenuity of all industrial relations men. Briefly phrased, the question might be put this way: "How can I find out what the laboring man in my own shop really thinks about unionization?"

An offhand answer might seem to be: "Send the labor relations director and his assistants into the shop, talk to the foremen and the men themselves, pop a few questions at them, and correlate the answers." That's fine—but it won't always work. And some companies have been brought up sharp by unforeseen strikes and internal turmoil just when they thought they had everything running smoothly.

Two Case Studies

Employers who have not, as yet, been approached by labor committees seeking recognition, and who want to have all the factual evidence at hand when that does happen, might profitably study a few case histories. With due care to avoid banging sore toes already heavily stepped on, let's delete company names and look at the record:

Case 1—A manufacturing plant is running nicely along the road to recovery, has been working on industrial relations for years, has been "written up" several times because of the foresight it displayed in keeping wages high and working conditions humane. It has watched the course of strikes in other plants and has been inclined to smile with self-satisfaction. Then—wham!—the model factory is shut down by a strike, weeks of delay ensue, an election finally is arranged among the men to find out whether they want the "new union" or not.

At this point the company management feels called upon to make a statement. It checks over the information it has, speaks to the press and public with all the sincerity and honesty in the world: "We are confident that the sentiment for a union in our shop affiliated with the national drive will be found to be far from a majority." In other words, the public is invited to watch closely—and of course the public does just that. Management of other firms is particularly interested, because it knows that the outfit in question is an up-to-date firm with its eyes wide open. Here's where those organizers get their come-uppance!

The vote? In the case under discussion, the new union polled four out of five. It was a pushover—and the company, face a bit red but nevertheless still on its feet, took it with a rueful grin and lost no time in getting back to work.

A Futile Conference

Case 2—Another manufacturer, also noted for his fairness and inclined to brag a bit now and then about how labor troubles have been eliminated, is asked for a collective bargaining conference. The parley is held. Another is held. And another—but no agreement is reached.

Then a final meeting is scheduled between union spokesmen and company officials. It looks like a settlement this time—but wait—something has happened. The parley is postponed, tempers rise, the company policy veers a bit. After a tense period during which no one seems to know just what it is all about, the deadlock is broken—by a strike.

Sundry officials rush to the scene from government agencies. Everything is cloaked in deepest secrecy for a time. Then, the clouds blow away as if by magic, and after a few soft phrases have been passed back and forth, by both sides, everybody goes back to work and the collective bargaining agreement is written.

There are more cases, but these two will suffice to illustrate two kinds of management difficulty. The first case is that of a company which was honestly misled from the beginning. It trusted the reports of company men so implicitly that it was willing even to cry victory before the final battle.

Some Facts Missing

The second account is of a policy that broke down in the middle of labor negotiations and went off on a tangent. It is a different case, but the error is the same—too much trust in fact-finders who didn't get *all* the facts.

Both companies had men in the shop, trusted men, old-timers who had been with the firm for years, and went to these men for advice. The old-timers misled the company. Yes, that's the sad truth. They said: "Take it from me, boss, this mob hasn't got anything we want and you will be making a terrible mistake to sign up with them."

In the second case we looked at, a perfect deluge of such advice and counsel struck the front office just as it was beginning to think that the petitioning union was telling the truth. The deluge was to some extent staged and directed by a smart minority of workers who saw a chance to get the contract themselves, and it had one weakness—it convinced the employer that the group he was talking to couldn't even pull a strike and make it stick.

What can management do to avoid such pitfalls? Should it turn a cold shoulder to helpful advice from the

shop, and should it look with suspicion upon the reports from its industrial relations men and its company attorneys? Should it be prepared to abandon ship as soon as it is boarded, even though the boarding force looks weak and small?

By no means. It *should* seek advice from all quarters. It *should* dig for the facts. And it certainly should refuse to be bluffed into signing a contract by threats of strike when the petitioning body has all the look of a racketeering minority.

But the finding of facts involves more than routine discussion and routine questioning of the working man. In the first place, management should realize that many workers won't tell the boss the horrid truth. The average worker in a non-union shop has signed a union pledge card or who has paid dues and, received a union button is very reluctant to admit the fact. What the hell—lose his job? Don't be silly—you can't drag the truth out of him, particularly if you are a company official. He'll sit tight, sign any "loyalty" cards you pass around the shop, keep his eyes on his job and his thoughts to himself.

Try the Foreman

A foreman isn't much better off when it comes to getting the real feel of union sentiment these days, but he is a better bet than the man who has been up in the front office for years and just now is showing his face in the shop for the first time. The foreman will usually be able to find out the facts if he is trusted and liked by the men—but will he tell?

That brings the problem up another notch. Can a company official—a minor official—be counted on to tell the big boss what's what? Sometimes he can, but in many cases he has found that the way to please is to tell the boss what he wants to hear. Let somebody else take the rap for being a scare-raiser and a dispeptic viewer-with-alarm.

Right now, in many shops, there really is no royal road to accurate information which the boss can travel over. But he has in his employ the men who can find the low-down, if he gives them the right instructions. They start like this:

"I want to know whether this company is going to be unionized or not. I don't want you fellows to feel sorry for me, or fearful for your jobs, if you find the answer is 'yes'. What I want is information—not soft soap. You are capable of getting the truth, and that's exactly what I want to hear."

Here's another angle: If you think the local newspaper isn't on the job, call in the labor reporter for a chat. You'll probably find that he knows more about your shop than he ever has written or ever will. Treat him white and let him know that if there are any scales over your eyes you want them knocked off. In nine cases out of ten he'll give you the low-down, and you can depend on it because he isn't being kidded by the other side nor by yours.

A third way: Ask one of your business friends, who has already been "taken" by the union, to give you some really disinterested comment on your own shop. Not flattery—honest appraisal. And see if he has a working man in his shop who would be able to render an offhand opinion of how your outfit stacks up. Not a union organizer—a working hand who has joined and who minds his own business. The heat will be off, in his shop, and he is bound to be on top of a lot of shop talk which concerns your own business.

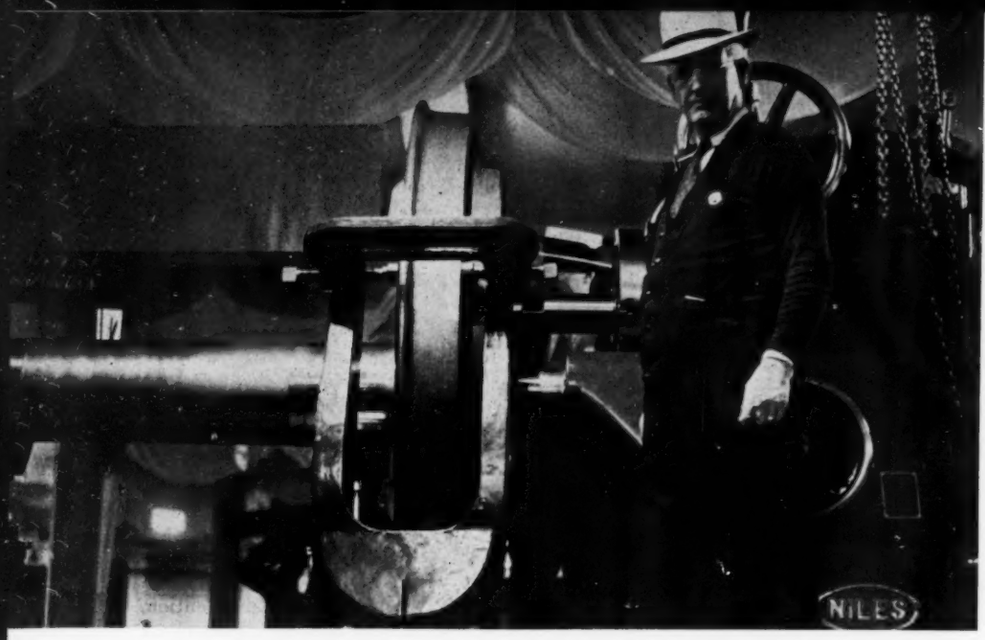
Unofficial NLRB Help

A fourth way—Look up the local regional director for NLRB, and toss your problem at him. Not officially as a demand for intervention, but as one citizen asking help of another. Don't freeze him, don't act the big, smart guy with him—tell him you're honestly in doubt and are coming in to ask a favor. You may find that he's several jumps ahead of you, when it comes to knowing which way the wind blows in your plant.

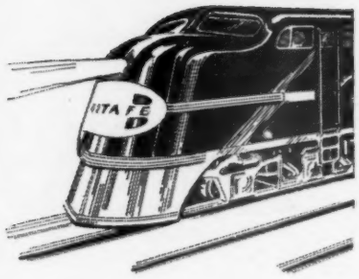
All of those ways of seeking information are being used today, and they all will help. The most important, by far, is the first-named. Management's big job these days is polishing up the industrial relations department so that it really works. When that is done, you'll see an easing of the bewilderment and gloom which encases a great many industries, and an end to the present system of playing cards for high stakes while blindfolded. A game that is very hard to beat.

© Acme

These anti-Ford banners at a mass meeting to protest the reopening of Republic's Newton Steel plant at Monroe, Mich., indicate what one group of workers thinks. The connection between Ford and Republic is not clear



J. J. Fisher explains the merits of Niles balanced quartering and crankpin turning machine



Railway Men Convene Again

ATLANTIC CITY, N. J.—After an absence of seven years the Railway Supply Manufacturers Association held a convention and exhibition on the occasion of the sixteenth annual meeting of the Mechanical Division of the Association of American Railroads, June 16–23. As in 1930 the scene of the exhibit was the Atlantic City Municipal Auditorium.

Manufacturers of materials, operating and maintenance equipment occupied 278 booths displaying new products designed to attract greater railway traffic and to reduce railway costs. In addition to the displays in the auditorium, a track exhibit was shown at the Union Station.

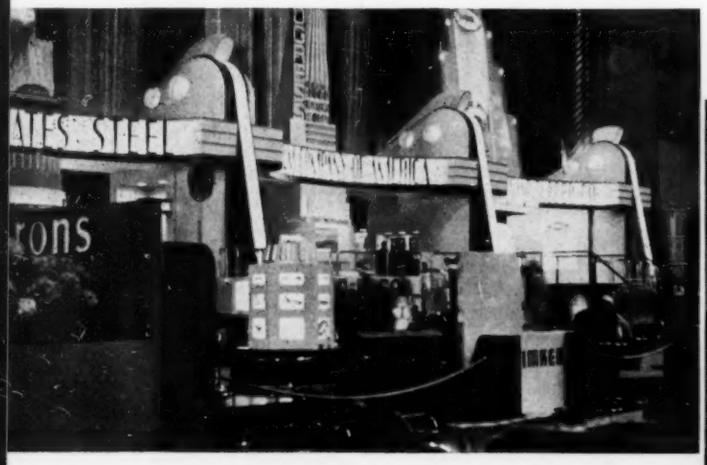
A.A.R. members were welcomed by the Hon. Charles D. White, mayor of Atlantic City. Committee reports presented during the sessions were supplemented by individual papers which included the following:

RESEARCH AND LOCOMOTIVE DEVELOPMENT, W. H. Winterrowd, vice-president, Franklin Railway Supply Company.

WHAT NEXT IN CAR EQUIPMENT? L. K. Sillcox, first vice-president, New York Air Brake Company.

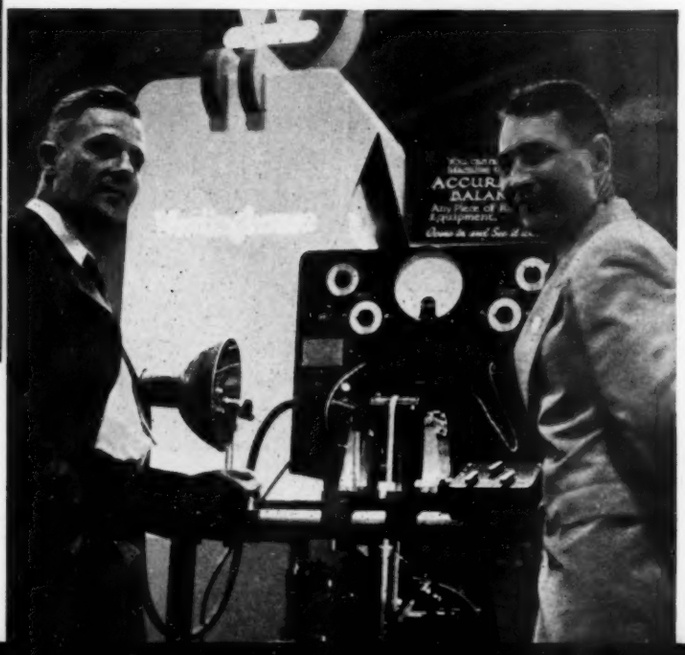
Four members were re-elected to serve on the A.A.R. Mechanical Division general committee from June, 1937, until June, 1939, as follows: H. B. Bowen, chief of motive power and rolling stock, Canadian Pacific Railway; W. H. Flynn, general superintendent of motive power and rolling stock, New York Central System; E. B. Hall, general superintendent motive power and machinery, Chicago and Northwestern Railway; J. A. Power, superintendent motive power and equipment Southern Pacific Lines.

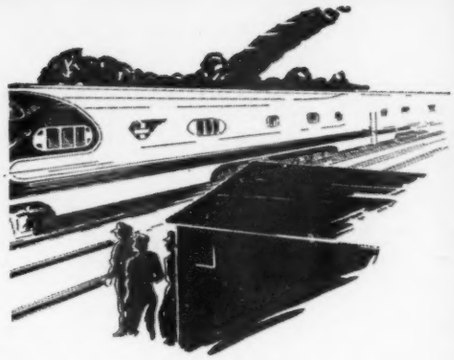
Of this committee, the chairman, J. W. Burnett, general superintendent motive power and machinery, Union Pacific Railroad, and the vice-chairman, F. W. Hankins, chief of motive power, Pennsylvania system are serving terms which do not expire until June, 1938.



Attractively decorated booths reflect a return of prosperity for the railroads

R. S. Elberty, Westinghouse, and F. L. Chapman, Gisholt Machine Company, discuss the need for balancing on railroad rolling stock





R. C. Bullard, E. C. Bullard and J. W. Bray of the Bullard Company aid in demonstrating this company's journal-box boring and facing machine

Atlantic City's Public Auditorium houses the Railway Supply Manufacturers Association exhibition after a seven-year interval

Bethlehem's model automatically controlled wheel heat-treating unit attracted a good deal of attention

Heat-Treating

For Sustained Accuracy

Only a half-dozen materials were used in the turret lathe of 50 years ago. Today's machine tools are constructed mainly of heat-treated alloyed metals, each carefully selected

D. M. GURNEY
Warner and Swasey Company
Cleveland, Ohio

PRODUCTION demands on manufacturing equipment are steadily mounting, particularly in the automotive industry. Present-day machine tools must have the ability to "take it." Equipment must be able to maintain accuracy of performance, despite the increasing loads and higher operating speeds imposed.

Development of high-speed steel, Stellite, Chesterfield metal and other materials of the same class tremendously increased loads imposed on machines used for the removal of metal. More recently, the application of tungsten- and tantalum-carbides to cutting tools has further increased the stresses to which machine tools are subjected. Maintenance of operating accuracies, originally built into machine tools, has been made more difficult.

Benefits from Alloy Steels

Machine tool builders have found it necessary to include in their designs the benefits obtainable from high-strength alloy steels. This has been done in order to give machine tools capacity for high-speed production without adding to their size and weight. Recourse to heat-treated alloy steels has been made on a wholesale scale by the Warner and Swasey company. With few exceptions, all alloy steels used in this company's machine tools are heat-treated, each steel being considered separately so far as heat-treating procedure is concerned.

Of the 3½ per cent nickel carburizing steels, S.A.E. 2315 is used extensively. Its nickel content increases the toughness and at the same time lowers the critical point of the material, permitting lower carburizing and quenching temperatures. This helps greatly in holding distortion of the piece being heat-treated to a minimum. The nickel also produces a small grain size which, in some cases, permits the high temperature for core quenching to be omited. This feature has been found especially valuable for those parts which require a hard surface with minimum distortion.

For such carburized parts as gears, clutches and pieces which require ultimate physical properties, a five per cent nickel carburizing steel known as S.A.E. 2512 is preferred. It has approximately 40 per cent better physical properties than S.A.E. 2315.

Probably the most widely used alloy steels in the shop are those of the S.A.E. 3100 series, ranging in carbon from 0.15 to 0.50 per cent, in nickel from one to 1½ per cent and in chromium from 0.45 to 0.75 per cent. The medium carbons are used for general forgings and structural parts, and the high carbons for gears.

Steel for Intricate Parts

Molybdenum steels similar to S.A.E. 4140 are used for parts that are to be machined after heat-treatment, because they possess exceptional machining qualities at higher Brinell values. These frequently range from 321 to 418. This steel is used for intricate parts that require high hardness and high physical properties difficult to obtain without undue distortion when using some of the other steels.

The heat-treating department has been equipped to perform practically any operation required. Working area has been kept clear of supply lines; those carriyng oil, water, gas, steam and air being laid in conduits underground and brought up where required. A large oil supply tank is also buried beneath the floor level. Water-jacketed coils through which oil from the quenching tanks is pumped for cooling are located along a rear wall.

Portable skid platforms, conveyed by electric trucks, are used to bring parts into the department. Some of the work, such as gear blanks, are delivered directly from the outside forge shop for normalizing and annealing prior to being machined. These skids are also used to transfer treated parts to the machine shop or store room.

Lift Trucks Used

The larger of the two jib cranes in the department is located mid-way of the working area where with its 18 ft. radius it can be used to transfer work from the skid platforms to hydraulic lift trucks. These trucks permit the transfer of parts directly into furnaces at hearth height. The smaller ½-ton jib crane is equipped with an electric hoist and serves a carburizing furnace. An overhead crane and a dozen or more air hoists, most of them suspended from monorail sections, facilitate loading and unloading the other furnaces.

An electric-gas, pit-type carburizing furnace was installed about eighteen months ago to replace four box-type furnaces previously used for pack hardening. The new furnace is particularly useful in handling those parts requiring close control of depth of carburizing, such as shafts, bushings, rods, studs and tool-holders manufactured from S.A.E. 1315 and S.A.E. 2315 steel. Daily output of this furnace is between 1,500 and 2,000 lb.

This furnace has shown remarkable performance in increasing the volume of parts handled per day and in reducing heat-treating costs. On S.A.E. X-1315 steel we find that penetration

Comparison of Carburizing Costs

	Pack Method	Elec.-Gas Furnace
Fuel	$8.50	$0.09
Alloy Containers	10.40	1.21
Labor, packing & unpacking	4.80	1.00
Compound	3.00	...
Power	...	2.38
Depreciation	...	1.55
Total Cost per Heat	$26.70	$6.23
Cost per Lb.	$ 0.0267	$0.0071
Cost per lb. — old method	$0.0267	
Cost per lb. — new method	0.0071	
Savings per Lb.	$0.0196	

Actual weight of material carburized in 140 days — 221,889 lbs.
Total actual savings achieved with new furnace — $4,349.02

Alloyed Steels for the Modern Turret Lathe

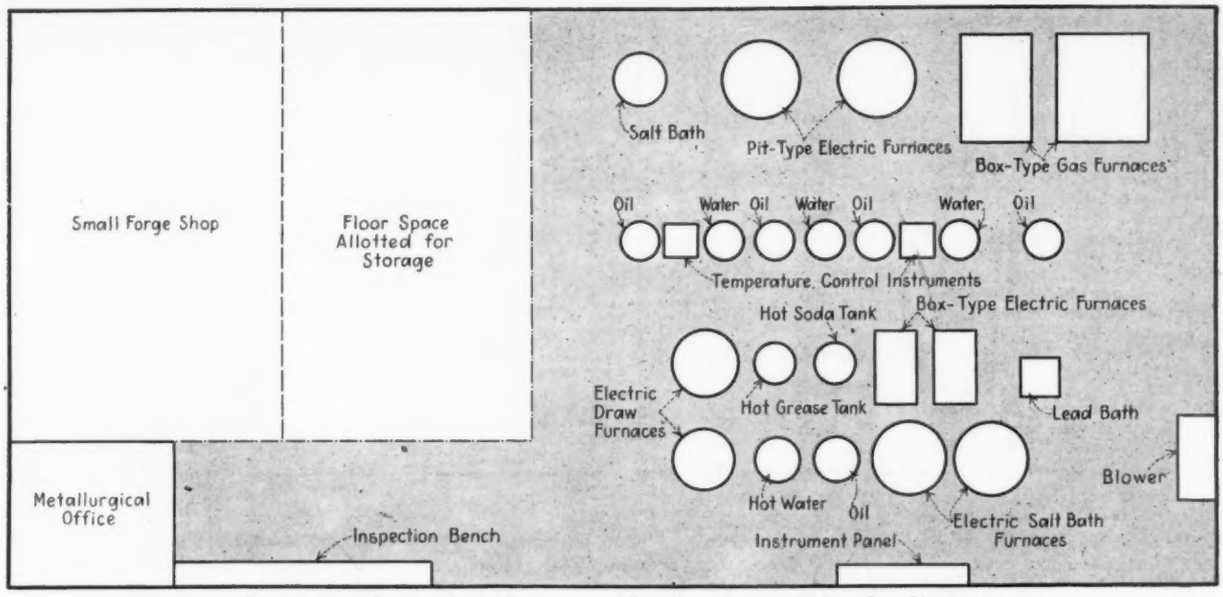
	S.A.E.	TYPE
Gears	3150	Low Cr.–Ni
Pinions, highly stressed	3250	Med. Cr.–Ni
Pinion shafts, highly stressed	3250	Med. Cr.–Ni
Heavy-duty clutches	2512	5% Nickel
Highly stressed studs, bolts, screws	3135	Low Cr.–Ni
Sleeves and spline-shafts	2315	3½ Nickel
Lock bolts and bushings	2315	3½ Nickel
Intricate parts requiring machining in heat-treated condition	4140	Cr.–Mo.
Rolls, ball bearings	52100	High Cr.–C
Roller bearings	4615	Cr–Mo–Ni

takes place at from 0.012 to 0.015 in. per hour when the charge is held at 1,700 F. Or, to put it another way, 0.05-in. case depth will require from 4 to 5 hours, depending on whether the stock is cold worked, forged, or hot rolled material. S.A.E. 2515 steel shows a slower penetration, running anywhere from 0.008 to 0.012 in. per hour, depending on its general surface condition. As is to be expected, the penetration rate for most steels falls off as the depth of case is increased.

Even under these conditions it has been found that material can clear through the heat-treating department rapidly and the load factor on the power side of the furnace be kept higher. In many instances a relatively small power capacity turns out as much carburized material as could be obtained from a furnace powered four or five times as high in the old box method without recuperation.

Two oil under-fired, box-type furnaces are being used for annealing forgings. Having a single source of supply for the steel of which our gears is made, initial uniformity and conformance to specifications of the

Parts to be heated-treated are transferred by skid-platforms and air hoists



Furnaces and quench tanks are so placed as to minimize the distance heated parts must be moved in a carefully planned heat-treating layout

material is such as to make it possible to give the finished product a definite Brinell hardness if heat-treatment is held to equally close limits.

Air cooling from a temperature of 1,600 F. is standard normalizing procedure applied to all forgings in advance of machining. For gear blanks this is followed by an annealing cycle of 1,525 F., with furnace cooling. The blanks are then Brinelled and have to fall within 187 to 217 to be passed as satisfactory. So uniform is the quality of forgings that rejections after normalizing and annealing are held to a fraction of a per cent. Between 20 and 30 tons of these parts are handled a month, and every piece is given a Brinell test after heat-treating. Some of the gears weigh between 200 to 300 pounds in the rough.

Following the normalizing, annealing and machining operations the gears are returned for further heat-treating. The electrically-heated salt pots, a soluble-oil quench tank, a tri-sodium washing bath and a 27-kw. Cyclone tempering furnace constitute a straight-line gear-hardening production unit. This group is served by an overhead monorail from which several air hoists are suspended to facilitate the transfer of the work from one step to the next. In the case of the quenching and washing operations, the hoists are used to mechanically agitate the gears as they are immersed in the oil or hot water.

A solution made up of 57 per cent sodium carbonate, 28 per cent sodium cyanide and 15 per cent sodium chloride is used in the 18-in. diameter by 24-in. deep salt pots. Regular procedure is to use one unit for pre-heating the gears to 1,250 F. before transferring to the second where a hardening temperature of 1,475 F. is maintained. Pre-heating the work before introducing it into the second pot has been found advantageous, since it makes it possible to hold the temperature of the hardening bath to very close limits and thereby provide more uniform heat treatment. Two thermocouples are used in each furnace, one being located in the salt itself, the other in the heating chamber.

Use of these salt pots for hardening gears—most of which are made of the S.A.E. 3150 steel—has been dictated by three important considerations: (1) uniformity of heating obtained, (2) speed of heat-treating possible, and (3) ease with which the gears, protected by the salt coating, can be kept free of surface oxidation, even during the transfer from the first to the second pot and from this unit to the adjacent quenching tank.

There are from 17 to 25 transmission head gears in modern turret lathes. These run in the same oil that lubricates the anti-friction bearings and consequently it is extremely important that they be thoroughly cleaned before going into the assembly. Oxidation from heat-treatment must be held to a minimum and care must be exercised that no distortion is introduced into a gear which would upset the accuracy of curvature of the teeth.

A water-soluble oil is used as the quenching medium. This is kept circulating through water-jacketed cooling coils via underfloor pipes. An air hoist equipped with self-actuated reversing mechanism is used to alternately raise and lower work in the quenching tank.

Tri-sodium phosphate, heated by waste steam from a hammer, is the cleaning medium into which the gears are next dipped. Here oil deposited during the quenching operation is removed and the gears are raised to about 200 F., preparatory to spending two hours at 475 F. in a tempering furnace.

Every gear, upon completing the heat-treating cycle, is spot-polished and given a Brinell test for the second time. For the S.A.E. chromium-nickel steels this test will run between 512 and 532.

Additional hardening equipment includes two Hevi-Duty furnaces, using natural gas for atmospheric control, with indicating pyrometers to control temperatures. Nearly all carburized parts, including miscellaneous tool steel parts, are hardened in these furnaces. The exceptions are those pieces which must be handled in pack boxes because of length.

Two electric hot-air furnaces for drawing operations, an oil-fired cyanide pot for cyaniding screws, bolts, nuts, and washers, an oil-fired lead pot and several small draw furnaces are sandwiched in at convenient locations between the larger furnaces. All are served by air hoists suspended from overhead sections of monorail.

Cam Locks
for Jigs and Fixtures

XI – Spiral-rise cams lock easily, have great holding power and are easily computed

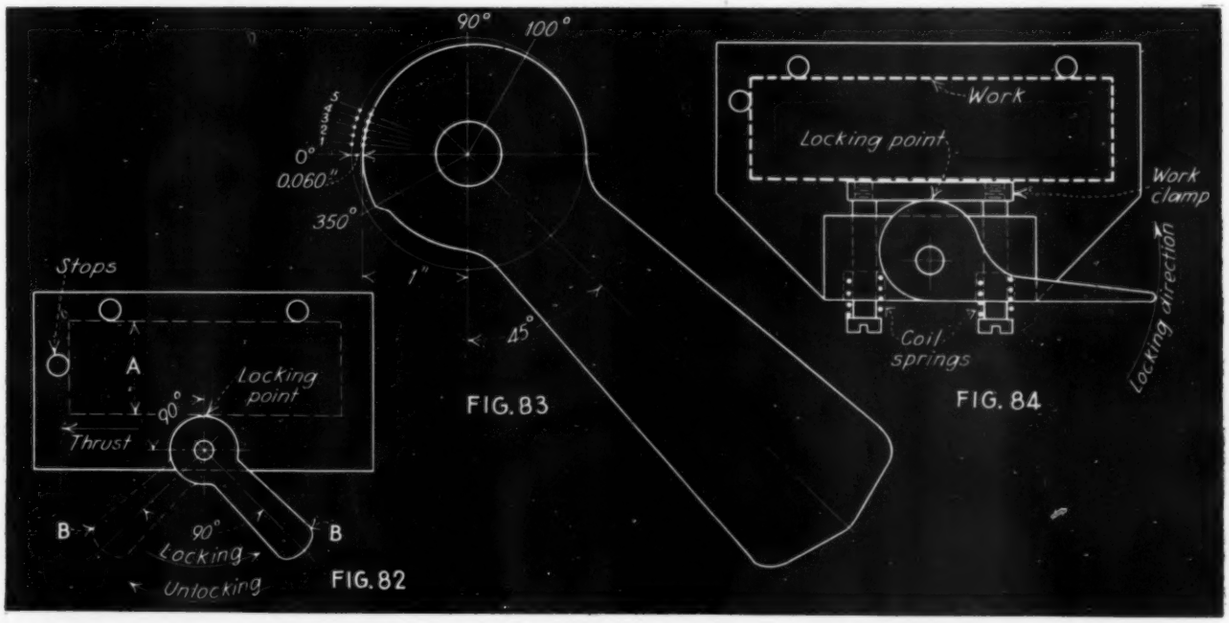
C. W. HINMAN
Tool Engineer
Kobzy Tool & Electric Manufacturing Company

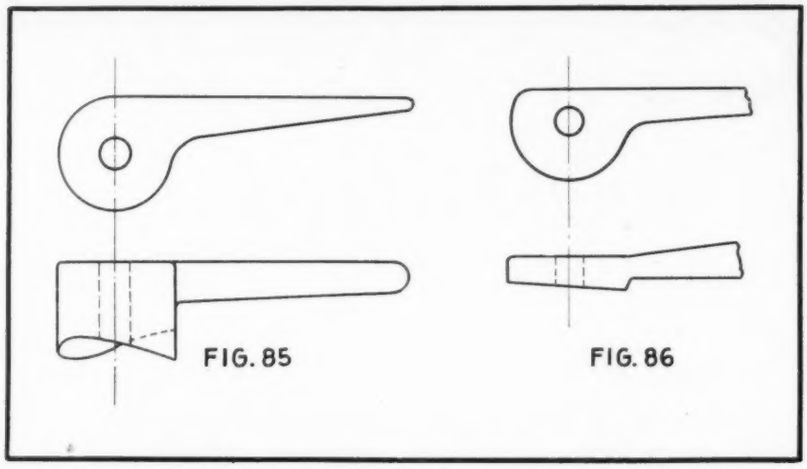
THE IDEAL fastening is one that locks and unlocks quickly and easily, and embodies great holding power. Such fastenings should require little thought and effort to operate. Tapered keys and spiral-rise cams probably meet these conditions best. These fastenings are analogous in principle, because a spiral-rise cam is simply a tapered key in circular form.

An eccentric cam fails to lock securely because the center of its circumference is at one side of its fulcrum-pin center. An eccentric cam is therefore quite useless for clamping, unless its center happens to lock nearly in line with the fulcrum pin and locking point, on the "dead center" line. Obviously this condition has very little chance to hold securely, especially when the clamped width varies slightly. A correctly designed cam has a true spiral rise, as used on the lobes of an automatic screw machine cam. Such a cam will lock securely at any point on its periphery when revolved into contact with the work. The method for computing correctly designed cams is:

Assume that width *A* in the work shown in Fig. 82, has a maximum variation of 0.060 in. in different pieces, and is to be locked with cam *B* by using a given handle throw of 90 deg. The maximum width of work is unlocked or released, when point 0 deg. on the cam is revolved clockwise 90 deg. to a vertical position. If a spiral rise of 0.060 in. is required

Fig. 82—A handle movement of 90 deg. is required to lock work *A*, and a variation of 0.060 in. in the piece width is assumed. Fig. 83—The cam rise at each 0.01 division of a circle is plotted for the 90-deg. handle movement and is continued 10 deg. each side. Fig. 84—A positive stop is not required when a cam is locked against a work support





Figs. 85 and 86—Face cams can have the rise continue around the periphery

in 90 deg., the cam will have a lead of 0.240 in. in one complete revolution of 360 deg., which is obtained by multiplying both 0.060 in. and 90 deg. by four. Cams are always computed from the total rise in one complete revolution. This rise is called: "The lead of the cam." Similarly, a thread lead is the distance from thread to thread in one turn. In tables for leads of cams, as published by milling-machine manufacturers, and used in connection with cutting cams on spiral-head milling attachments, all leads are given for one revolution of the cam.

Cam Layout

If the 90-deg. working face, or periphery, of the cam is laid out in radial divisions in hundredths of a circle, Fig. 83, it is evident that the rise for each division is 0.0024 in., which is obtained by dividing 0.240 in. by 100. If 1 in. is taken for the height of point zero from the cam center (which is about right for a small cam of this character) the height of the next division is 1.0024 in. from cam center, and the next is 1.0048 in. By adding 0.0024 in. to the last total for each of the 25 divisions in 90 deg. we have a final total of 1.060 in., which represents the required rise. A curved line drawn through the points at the height of each of the 25 divisions is approximately the spiral rise. It is sufficient at least, for most practical purposes.

Cutting the Cam Rise

When fabricating the cam the correct rise is obtained by securing the blank, through its center hole, on the arbor of a spiral-head milling attachment, and cutting an accurate rise, using the lead and change gears found in the tables. A cam may also be drilled around on a jig boring machine, or laid out by hand as described above, and drilled or nibbled approximately correct, and then filed to line. In Fig. 83 the cam rise is extended 10 deg. each side of the given 90 deg. to provide for extra variations in the work. The cam is suitably rounded off and merged into the handle design as shown.

The locking direction of the cam periphery, when it bears directly against the work, Fig. 82, should be toward a positive stop. When the cam is locked against a work clamp, however, as in Fig. 84, this precaution can be ignored.

Cams which are made with a face rise, Fig. 85, are sometimes used for clamping metal pieces, but are generally employed for holding non-metallic work. Sometimes the rise is made to continue all around the entire face of the cam, as shown, or for only half its face, or less, as in Fig. 86. Either condition depends upon the available space for the handle throw.

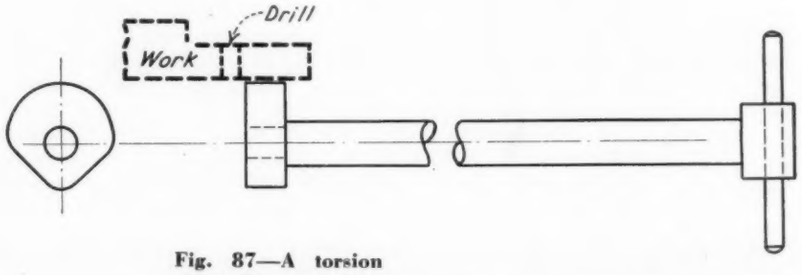


Fig. 87—A torsion rod will operate a cam lock far within a tool or only half way

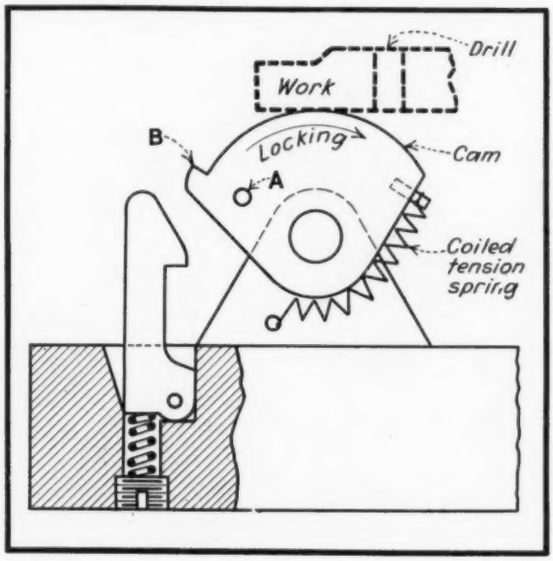


Fig. 88—A tension spring snaps the cam into contact with the work when projection *B* is released from the latch jaw

Fig. 87 shows a cam that is operated at the end of a long torsional rod for supporting work far within the tool, or at a point otherwise difficult to reach.

The operation of the cam support sketched in Fig. 88 is practically automatic. When removing the work from the tool, the cam is quickly unlocked by revolving it backward, using pin *A* for the purpose, until the cam projection *B* is hooked under the latch jaw. After another piece of work is placed in the tool, the latch hook is simply released by pulling it

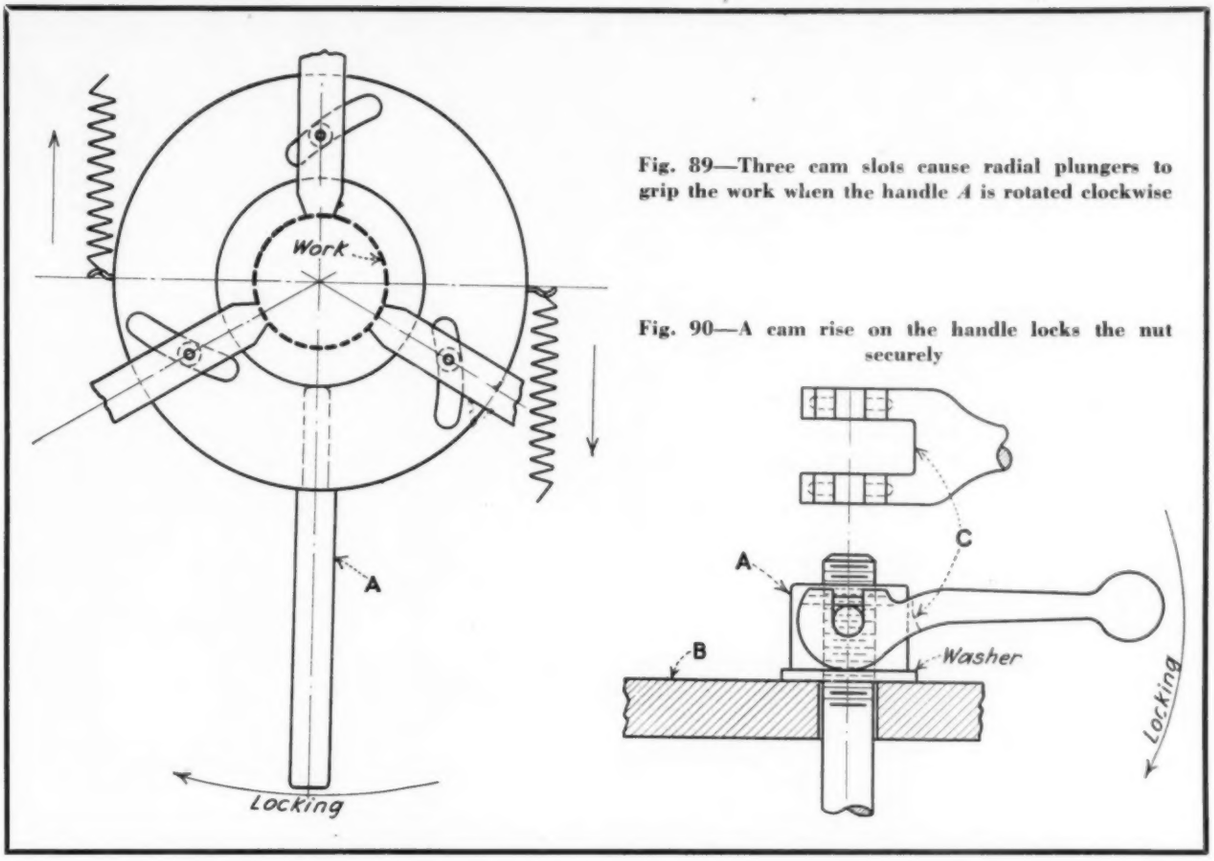


Fig. 89—Three cam slots cause radial plungers to grip the work when the handle *A* is rotated clockwise

Fig. 90—A cam rise on the handle locks the nut securely

open, and the coiled tension spring instantly revolves the cam edge into a positive supporting position against the work, as shown. This cam does not distort even frail work. If it does so, the coiled spring can be weakened.

A ring having three equally spaced cam slots around its circumference is designed to centralize and hold circular work. In Fig. 89, three equally spaced radial plungers, with pins or rollers attached that fit in the cam slots, are aligned toward the ring center. These plungers have an equalized reciprocating movement to and from the center, when the ring is revolved in either direction by using handle *A*. It is an easy matter to redesign the handle with a cam head, and to mount it in the ring on a fulcrum pin, by which the ring can be immovably locked after the work is centralized and clamped.

A Secure Fastening

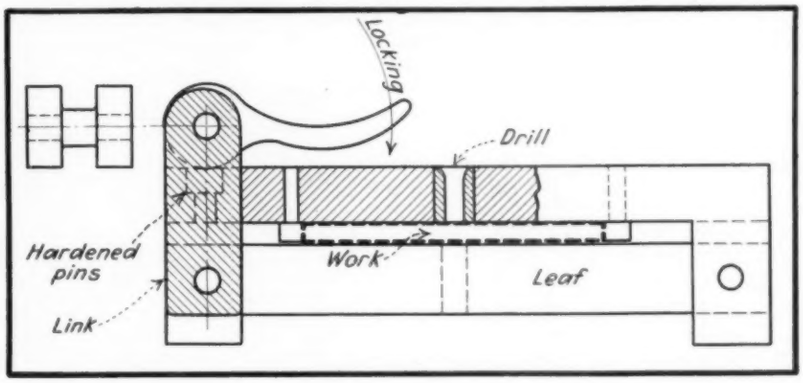
Another locknut design for securing a tool fastening to withstand machine vibrations without loosening is given in Fig. 90. The nut *A* is shown in its locked position against clamp *B*, with a washer between. When the handle is raised to unlock the cam, its throat *C* contacts the side of the nut which checks the handle at its most convenient elevated position for rotating the nut. If the bolt is cut with double lead threads, it will shorten the time in operating this fastening.

The cam and link design, Fig. 91, for locking a jig leaf, is quick to operate and inexpensive to make. Conditions may arise, however, when drilling through guide bushings in the leaf, where it is advantageous to reverse the link and pin it in the jig body, and lock the cam over the leaf. This design is slower to operate, and precision drilling through the leaf should not be attempted if it can be avoided, because the inevitable wear in the hinge pins will finally cause inaccurate locations of drilled holes in the work. When the cam and hardened pins underneath it are unduly worn, the pins are shimmed up or replaced.

Most of the enumerated principles given for jig fastenings and supports, are also applicable in milling fixtures and similar tools for holding work.

Part XII of Mr. Hinman's Series on tool design will appear in an early number.

Fig. 91—A cam and link are inexpensive means of locking a jig leaf



Modern Plant *for Modern Tools*

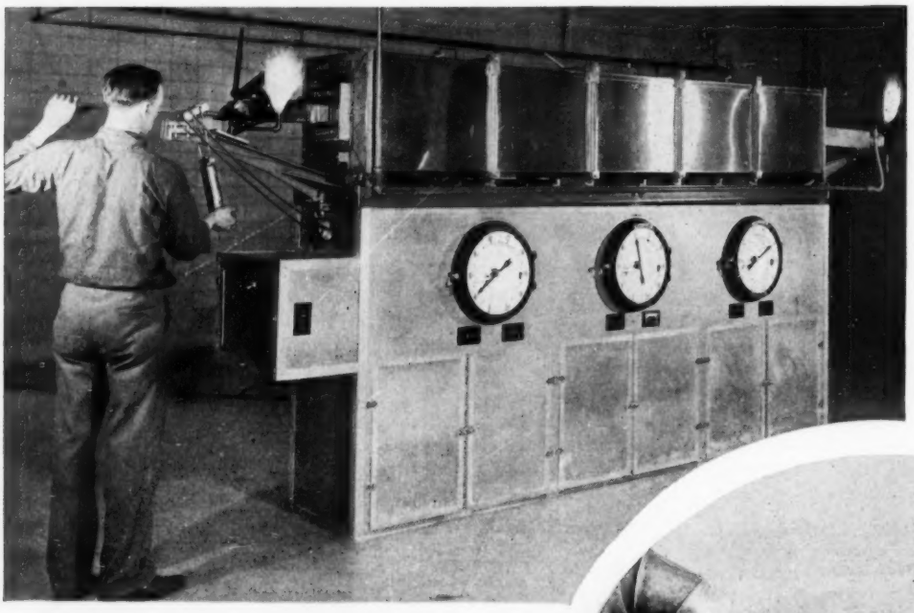
THE FIRTH-STIRLING STEEL COMPANY has opened a sintered carbide plant at McKeesport, Pa., which is the largest of its kind in the world. It produces Firthite for cutting tools and Firthaloy for drawing or forming dies, and has special departments which make Firthite tools and Firthaloy dies.

Designed to eliminate wasteful handling of materials and to save time, the plant is equipped with modern machinery and is of modern construction. Every effort has been made to eliminate presence of dirt and foreign matter. In addition to the liberal use of glass brick, stainless steel and aluminum, some rooms have terrazzo floors, Carrara glass walls and linoleum ceilings. As an added precaution the ventilating system has been provided with dust filters.

Iron tungstate taken from mines in Colorado is brought to the plant, ground, then heated with carbon powder to a high temperature in a non-oxidizing atmosphere. After crushing in ball mills, the carburized powders are mixed with tantalum carbide, titanium carbide and cobalt powders in the mixing room.

In the center of this room is a stainless steel sink where the mixes are made and saturated with distilled water preparatory to ball milling. Dust in the mixes must be avoided to prevent faults in the material and eventual rejection of the tool. The easily cleaned linoleum ceiling, Carrara glass walls and metal bench tops aid in the prevention of dust accumulation.

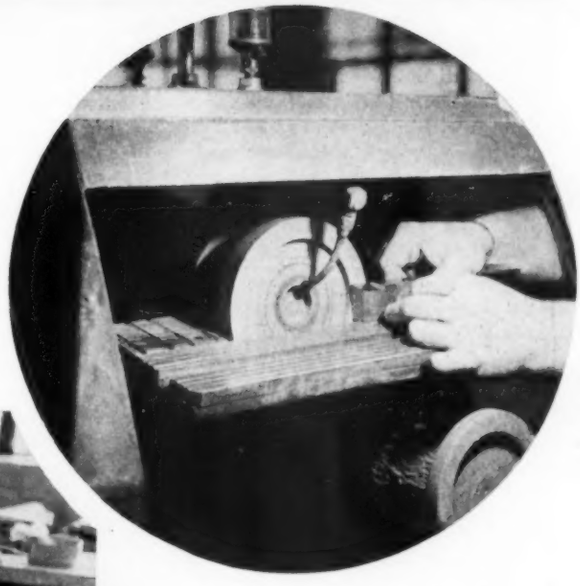
After rolling, the charge is returned to the mixing room, drained of excess water and dried in ovens. The dry powder is pressed to desired shape and size in a 400-ton press. Although pressures range from 4,000 to 60,000 lb. per sq.in., the molds must be disassembled without affecting the carbide bricks as they are quite fragile.



Placed on graphite slabs, the carbide blocks pass through the "presintering" furnace. Metal particles are melted sufficiently to join, thereby reducing fragility of the cakes and giving a chalk-like hardness

Hardened cakes are shaped in a separate room in which air is kept carefully clean for the workman. A die is being shaped on this small lathe which is equipped with an elaborate exhaust collector system

Copper or silver solder is used in the brazing department for holding the carbide edges in the steel shank. These electrically heated hydrogen atmosphere furnaces are available to customers who wish to make their own tools and dies



Packed in carbon powder, in carbon "boats," the shaped pieces are introduced in a pre-heating section of a tubular furnace (alundum tube wound with molybdenum resistance wire). They are mechanically stoked or pushed through alternate heating and cooling sections, always in a hydrogen atmosphere

Carbides then go to the tool or die shop on the first floor. The machine shop is like any other except for the use of diamond wheels for finer grinding operations. Exhausts with protection for the operator from fine particles, cover the wheels

Ideas from Practical Men

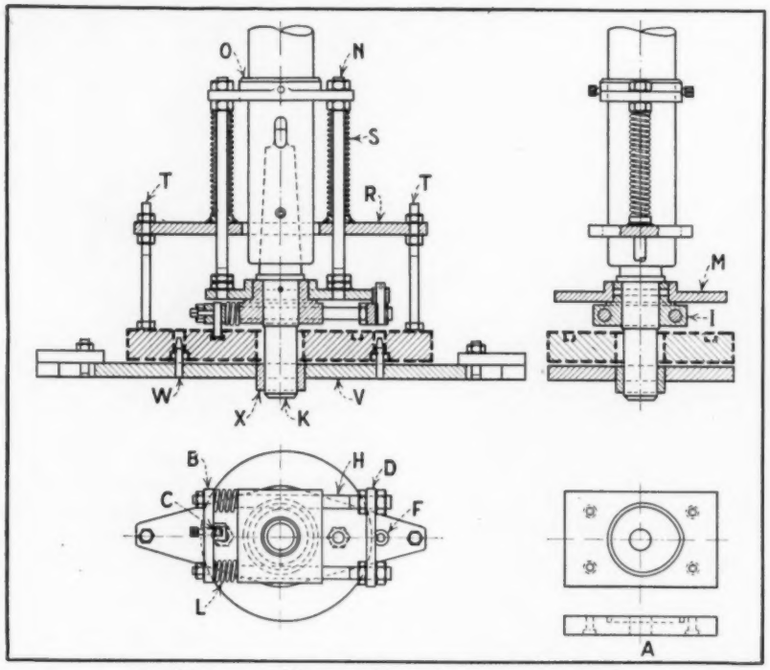
Cam Cutting Attachment for the Drill Press

EMIL WITTMAN

Having to cut a large quantity of cams in fiber plates, as at *A*, and no profiling machine being available, the attachment illustrated was designed for use in the drill press. Since the path of the cams was in the form of an Archimedean spiral, the cutting was done with a toolbit rotating around the axis of the work and reciprocating in a radial path toward and away from its axis, keeping the cam race at an invariable width. This condition can be maintained with the Archmedean spiral, but very likely not with other spirals.

Strap *B* carrying the toolbit *C* and strap *D* carrying the cam roller *F* are assembled with rods *H* to form one unit, which is free to slide on the guide piece *I*, the guide piece being attached to shank *K*. Springs *L* keep the cam roller in contact with the master cam *M*, which is a free fit on the hub of guide piece *I*, but is prevented from revolving by the rods *N* attached to the flange *O*, the flange being stationary and attached to the quill of the machine by setscrews.

Hold down plate *R* is free to slide on rods *N* and is forced down by springs *S*, making contact with the work through bolts *T*. Plate *V* is attached to the machine table and has two pins *W* for locating the work. Bushing *X* in plate *T* is for steadying the lower end of shank *K*.



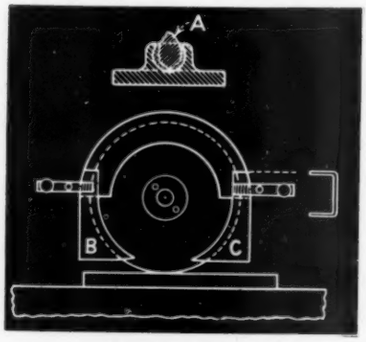
Lacking a profiling machine, the cams were cut in good time in a drill press by this ingenious fixture. A toolbit was used instead of a rotary cutter

In operation, with the drill press running, the work, shown in heavy dotted lines, is placed on pins *W* and the spindle is lowered, bolts *T* coming into contact with the work and holding it down. When the toolbit is near the work, the feed is engaged and the toolbit is fed to the depth of the cam race. The assembled unit consisting of straps *B* and *D* and rods *H* revolve with guide piece *I*, and at the same time reciprocate, being controlled by the contact of the cam roller with the master cam, thereby controlling the movement of the toolbit. When the automatic stop disengages the feed, the spindle is raised to the starting position, permitting the finished work to be removed and another piece to be put in. The tool has sufficient clearance to prevent interference.

Grinding Cast Iron to a High Finish

GEORGE J. MURDOCK

It is often desirable to obtain a surface having a high polish on cast iron, as well as to have it sufficiently flat for a bearing. Under ordinary



Cast iron lubricated with turpentine in which camphor and beeswax have been dissolved can be ground flat and to a high polish

conditions it cannot be done, due to the large percentage of graphite in mechanical combination with the iron and to the porous texture of the metal itself.

To grind gray-iron castings to a

high polish, a grade *J* wheel has been found most suitable. After the work has been ground to within about 0.002 in. of size, the wheel is dressed with a diamond and a piece of carborundum soldered to an iron shoe, as at *A* in the illustration, is run under it lightly, the table being moved slowly.

When all is ready to proceed with the finishing cuts, tin aprons, as at *B* and *C* are clamped to the wheel guard, their bottoms being about ¼ in. above the work. The wheel is carefully lowered so that when run onto the edge of the work a slight sparking will be seen. The work is lubricated with a mixture consisting of 8 oz. of turpentine in which ½ oz. of gum camphor has been dissolved and to which 2 oz. of shaved beeswax has been dissolved.

The lubricant is applied a little at a time in front of the wheel as the work advances and is prevented from spattering over the machine table by the tin aprons, which collect it so that it drips down on the work and is used over again. Not more than 0.0005 in. should be removed from the work at each cut, and as size is approached the wheel should be allowed to run over the work several times without adjustment.

When finished, the work is wiped clean with a small piece of waste wet with denatured or wood alcohol to remove the turpentine. When the work is dry it will reflect any object held near it equal to hardened and lapped steel.

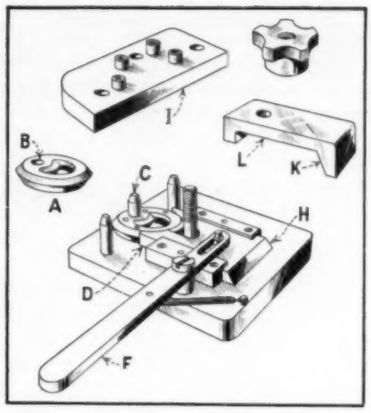
It is, of course, necessary that all the machine bearings should be snugly adjusted.

Jig for Drilling Magnets

CHARLES H. WILLEY
Superintendent of Manufacturing, Hoyt Electrical Instrument Works

Illustrated is a jig for drilling the screw holes in the drop-forged magnets used in one type of our electrical instruments, a magnet being shown at *A*. The hole *B* was drilled and reamed in a previous operation without a jig, a dimple for centering the drill being made in the process of forging.

The magnets are located by the pin *C* engaging the hole *B* and are centered by the sliding V-block *D* which is operated by the lever *F*. The back end of the V-block is beveled at *H*, so that as the bushing plate *I* is clamped in place, the inside bevel *K* on the clamp *L* holds the V-block tightly against the work and prevents it from shifting out of center when the operator lets go of the lever.



The work is centered by a sliding V-block. As the bushing plate is clamped in place, the V-block is forced into contact with the work

Shaft Locating Tool

JAMES W. EMMONS

In the sketch is shown a tool by which a ⅝-in. shaft was located centrally with and at a right angle to a 1-in. shaft that projected through the frame of a machine. Since the shafts were to be fitted with bevel gears, it was very important that their axes should coincide.

The tool *A* is simply a piece of round steel bored to a diameter of 1 in. at one end and slotted centrally to a width of ⅝ in. at the opposit end, the bottom of the slot being at the proper distance from the bored end.

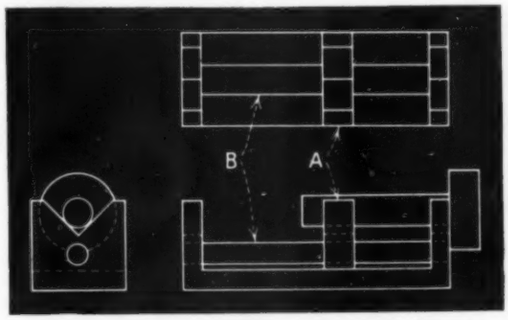
In use, with the 1-in. shaft *B* placed in its bearings in the machine frame and with the end projecting therefrom, the bored end of the tool was placed over its end. Then the ⅝-in. shaft *C* was placed in the slot, bringing the axes of the shafts into coincidence. All that remained to be done was to put the bracket *D* on shaft *C* and attach it to the machine frame in the correct place for fitting the bevel gears. If shaft *C* required to be set at a predetermined angle to the horizontal, it could be set by a protractor equipped with a level. It was found that this tool did the job 75 per cent faster than formerly.

Sliding V-Block

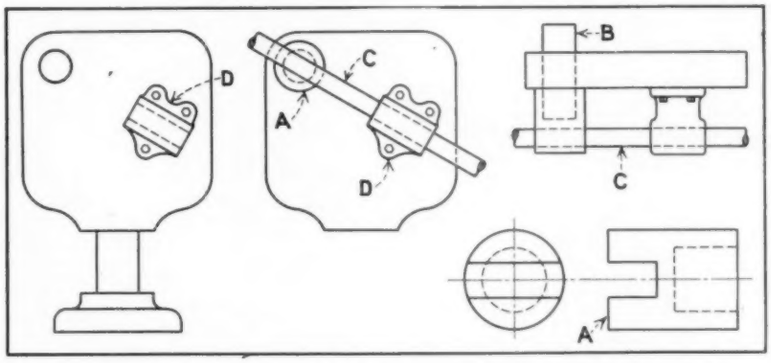
H. MOORE
Leeds, Yorkshire, England

In drilling work having shoulders, or work short enough to be held in a single V-block, the work is often in such a position that the point of the drill will contact the block as it comes through the work and damage the block. If the V-block is hardened, the drill may be broken. A sliding V-block is much better for work of this kind because it can be located to suit the work and yet leave a clear space for the drill as it comes through.

The base of the sliding V-block illustrated has a stationary V-block at



The base has a stationary V-block at each end. The sliding V-block is guided by a rod and is always in alignment with the two end blocks



The bored end of the tool is placed over the end of the projecting end of one shaft and the other shaft is placed in the slot

each end, between which is the sliding V-block *A*. It may be slid to any position within the range of the base and is guided by the rod *B*, so that it is always in alignment with the V-blocks at the ends of the base.

Four Types of Collet Chucks

J. R. WHITTLES

In the illustration are shown four types of collet chucks for holding work having a center hole in one end only. Such work is produced in turret lathes and is finished by grinding.

In Figs. 1 and 2 are chucks in which the inner ends of the collets *A* are centered and are supported by the headstock center, the outer end of the work being supported by the tailstock center. The holes in the collets are deep enough only to provide the necessary spring. The only practical difference between these two chucks, besides being made to hold work of different shape, is that the collet in Fig. 1 is closed on the work by screwing the sleeve *B* outwardly, while the collet in Fig. 2 is closed on the work by screwing the sleeve *B* inwardly.

Collet chucks for holding the same work as those in Figs. 1 and 2 are shown in Figs. 3 and 4 in the form of brackets mounted on the faceplate of the grinder, instead of being supported on the headstock center. The brackets have circular pilots or tongues at *C* to fit corresponding recesses or grooves in which the pilots engage to insure accurate centering.

In the chuck in Fig. 3 the collet is threaded at the rear end and is closed by a nut at *D*, an opening in the bracket permitting the use of a wrench. On the chuck in Fig. 4 the collet is held tightly in the bracket and is closed by screwing the sleeve *B* inwardly. In each case a Woodruff key at *F* prevents the collet from turning in the bracket as it is tightened on the work.

Kinks Did It—Why?

N. V. SMITH
President, Smith-Johnson Corporation

For the last several months there has been quite a discussion of George J. Murdock's article under the above title (*AM*—Vol. 80, page 893) as to the removal of frozen milling machine arbors from their spindles. All of these systems have entailed a large amount of hard work on the part of someone, plus the danger of permanently damaging the machine. I wonder why someone has not hit on the obvious and very simple method that we have used.

In an exactly parallel case we tapped the rear end of the milling machine spindle for a pipe thread, installing an extra-heavy nipple and reducer, screwing into the reducer an ordinary grease fitting such as the hydraulic type. Now all that remains is to attach a grease gun, preferably of the power high-pressure type and apply pressure to the grease through the nipple and against the inner end of the arbor.

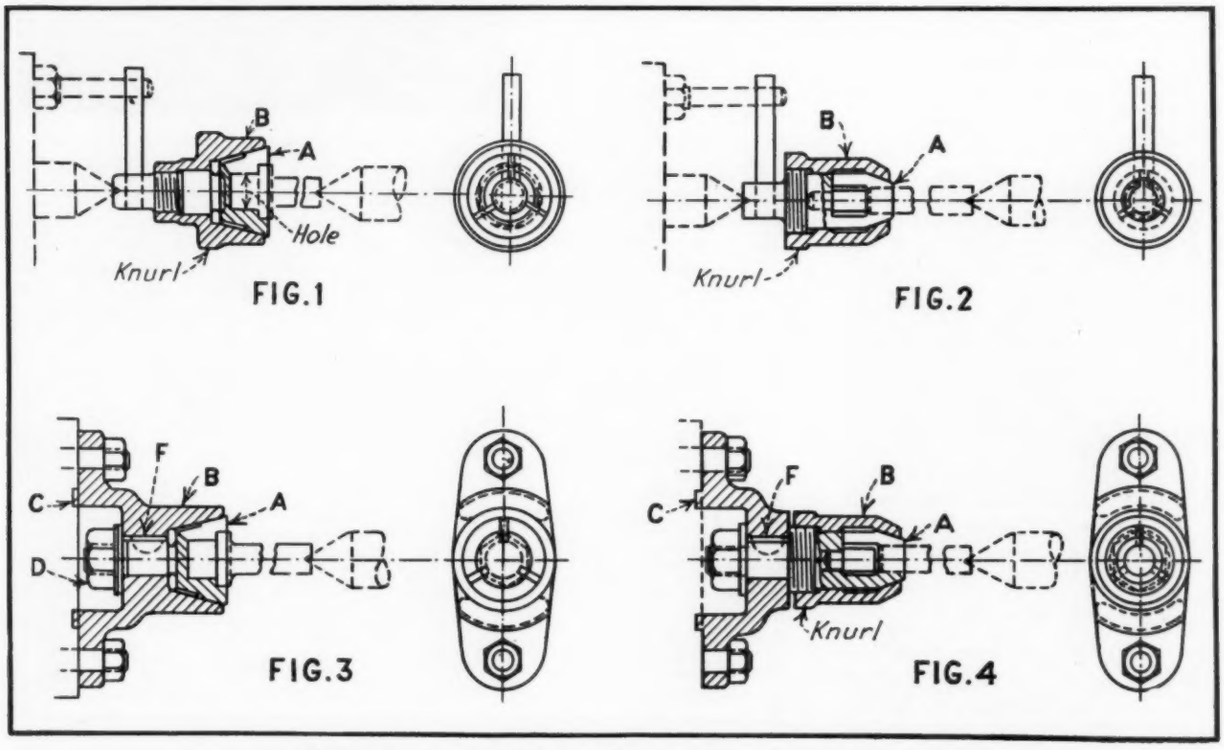
There is only one further point that might be mentioned. Don't stand in front of the arbor because when it releases it usually comes loose with a bang.

If the direct pressure of the gun doesn't do the work, try letting it stand for awhile with the pressure on it or fasten the lubricant receiving nipple to a T which has been plugged in the outward end, and tap on this plug with a light hammer while applying pressure.

Finding the Diameter Without the Center

MARTIN C. KLEP
Designer, Consolidated Edison Company of New York

In the illustration for this article by George L. Garvin (*AM*—Vol. 81, page 331) there is an error that may cause trouble for some users. In the triangles involved to obtain the formula, one of the sides labeled *x-y* should read *x-r*.



Work made in turret lathes and having a center in one end only can be accurately held for grinding in such collet chucks as these

American Machinist
REFERENCE BOOK SHEET

Effects of Wheel Speed on Polishing Performance

The usual recommendation for the most efficient speed of polishing is 7,500 surface ft. per min., but recent studies show that this is not correct. Under the conditions of the test a wheel speed of 5,000 surface ft. per min. was found to be most economical and efficient.

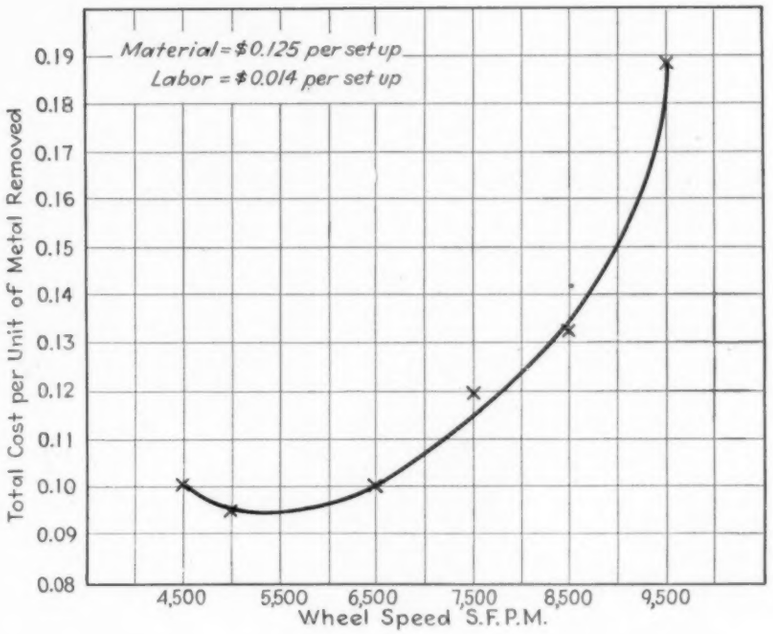
The most commonly used bond for polishing wheel abrasive grain is animal hide glue. The limited strength of hide glue in bonding abrasive grains is the main factor that governs the speed of a polishing wheel in operation. This is not a serious loss, because the increase in rate of cut caused by higher speeds as related to materials cost is not in proportion to that found in high-speed grinding. Actual data on this point were determined by a test of polishing-wheel speed with the following results:

1. Under the conditions of test the cost of polishing data indicated a wheel speed of 5,000 surface ft. per min. to be the most economical and efficient.

2. Increasing the wheel speed at the constant pressure of 40 lb. increased the wheel wear rapidly, particularly at speeds higher than 6,500 surface ft. per min. As the wheel speed increased the performance was that of a softer wheel.

3. Increasing the wheel speed increases the rate of cut but not to a much lesser degree than wheel wear.

The results are tabulated as follows:



Wheel Speed	Metal Removed	Wheel Wear	Labor plus Materials Cost per Unit of Metal Removed
4,500 s.f.p.m.	213	21	$0.10
5,000 s.f.p.m.	236	21	0.095
6,500 s.f.p.m.	232	26	0.10
7,500 s.f.p.m.	236	36	0.120
9,500 s.f.p.m.	247	52	0.189

A study of this table shows that the most economical speed for the test conditions was 5,000 surface ft. per min. Moreover, the results indicate that the wheel wear increased about 150 per cent between 4,500 surface ft. per min., and 9,500 surface ft. per min., and that the rate of cut or metal removed increased only sixteen per cent.

On the basis of this speed test it is reasonable to conclude that it is expensive to operate polishing wheels at speeds too high for the conditions involved.

Polishing tests made at wheel speeds of 8,500 surface ft. per min. (not tabulated) were erratic, giving a wheel wear, rate of cut and polishing cost higher than 9,500 surface ft. per min. A check of the machine with a vibration instrument disclosed that the critical vibration point of the machine was at a wheel speed of 8,500 surface ft. per min., thus accounting for the erratic results obtained.

The vibration readings were as follows:

Wheel Speed	Machine Vibration
5,000 s.f.p.m.	0.0001 in.
6,500 s.f.p.m.	0.0003 in.
7,500 s.f.p.m.	0.0002 in.
8,500 s.f.p.m.	0.0010 in.
9,500 s.f.p.m.	0.0005 in.

The results indicate the advisability of checking whether or not polishing machines installed are operating at or near their critical vibration point.

The conditions of the speed test were as follows:

1. Wheels used were 16x2 in. No. 100 duck canvas.

2. Abrasive grain was 36 Alundum C.

3. The glue had a viscosity of 90 millipoises, a jell strength of 252 grams, a P.H. 6.4 and did not foam. Solution was made up of 4½ parts glue and 5½ parts of water by weight.

4. Metal polished was tool steel of Rockwell B 80 hardness.

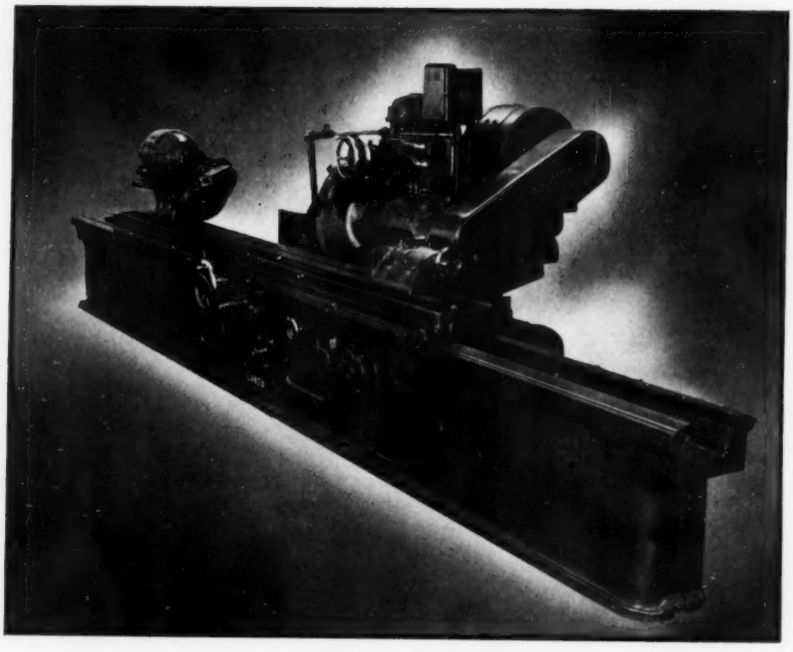
5. Drying of the wheelhead was done as follows: one-coat wheels were set up and dried for 48 hr. at 85 F. and 50 per cent relative humidity.

6. A special polishing cradle was constructed so that contact pressure was kept constant at 40 lb.

7. The strips of tool steel were traversed under the wheel at a rate of 40 ft. per min.

Abstracted from an article by W. Pettigrew in *Grits and Grinds* published by the Norton Company.

Shop Equipment News



Hydraulic system of Landis Type BD grinders consists of a low-pressure variable-flow pump driven by a constant speed motor

Landis Type BD Plain Hydraulic Grinders

The 10-in. and 14-in. Type BD plain hydraulic grinders offered by Landis Tool Co., Waynesboro, Pa., are designed for grinding relatively long work having small diameter. When necessary, table may be gapped to swing work having projections. These machines supersede Type B plain grinders.

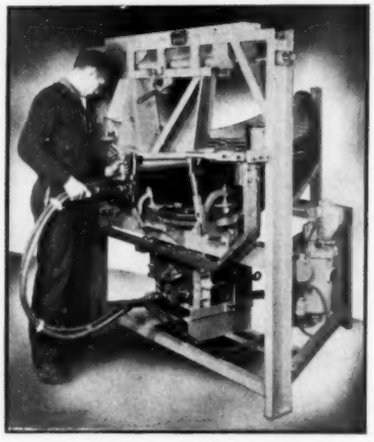
Wheel-drive motor is dynamically balanced and is mounted on the rear of the wheel base from which point the drive to the right-hand end of the wheel spindle is through multi-V-belts. Babbitt-lined steel wheel-spindle bearings are used. They are flood lubricated continuously with filtered oil. An all multiple V-belt work-drive is a feature of the headstock. A simple adjustment is provided to maintain the proper tension on this drive. Table traverse speed range is 12 to 240 in. per min.

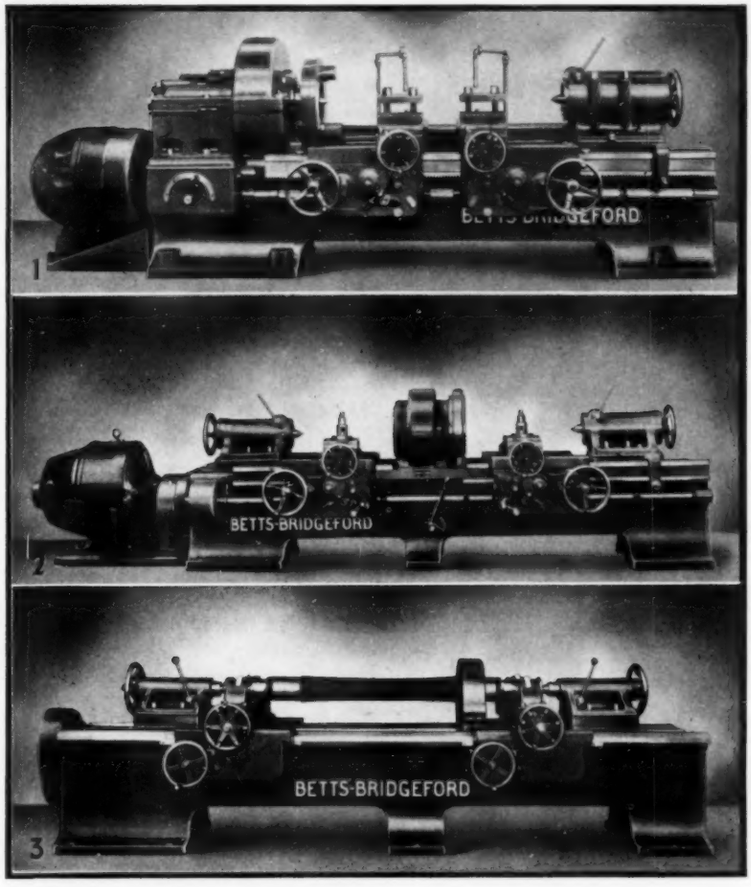
These machines are available in four sizes, namely: 10x96 in., 10x120 in., 14x96 in., and 14x120 in. Net weight of the 10x96-in. machine is 17,800 lb. Three electric motors are required. The work-drive motor on the 10-in. machines is 1 hp., 500 to 2,000 r.p.m. adjustable speed. This motor is increased to 1½ hp. on the 14-in. machines. Wheel-drive motor is 15 to 20 hp., 1,150 r.p.m. constant-speed and a 5-hp. motor is used for the pump drive.

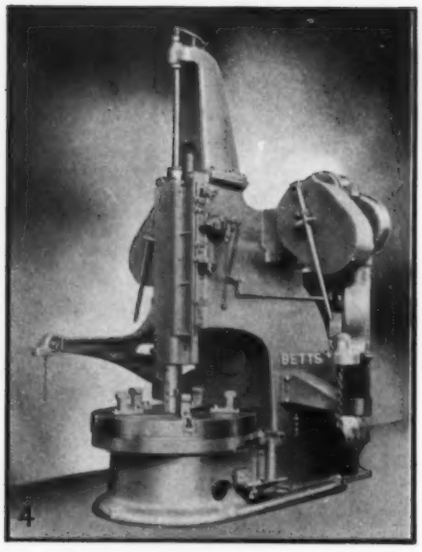
Progressive Special Welding Fixtures

Progressive Welder Co., 737 Piquette Ave., Detroit, Mich., will design and manufacture spot-welding fixtures for use with the hydraulic welding gun previously described, (*AM*—Vol. 81, page 383). Copper bus-bars are cast to fit the parts to be welded. Parts to be welded are clamped and positioned in the fixture by quick-acting devices and the arrangement of these devices is such as to permit easy handling of the work.

Transformer and hydraulic booster for the hydraulic welding gun are mounted on the fixture, making a compact unit. It is only necessary to connect the fixture to air, water and electrical supply lines in order to put the equipment in operation.







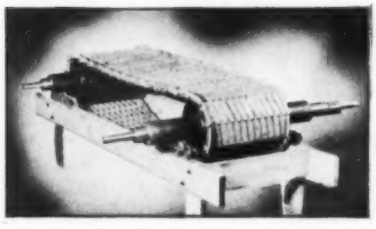
Figs. 1 and 2—Betts-Bridgeford end-drive and center-drive axle lathes now have hardened steel inserts in the ways. Fig. 3—The axle-burnishing lathe features opposed rollers that float as a unit. Fig. 4—An automatic cycle of operation has been developed for the Betts hydraulic car-wheel borer

Consolidated Railroad-Shop Machines

Consolidated Machine Tool Corp., Rochester, N. Y., has announced improvements in three machine tools designed for railroad shop use and has added an axle burnishing lathe to the Betts-Bridgeford line. This burnishing lathe is designed for rapidly finishing all sizes of M.C.B. axles on a production basis. It consists of a bed, two carriages on which are mounted opposed burnishing rollers, two tailstocks and a set of ring gear chucks. In operation the chuck, which is easily handled, is slipped over the end of the axle to the finished surface of the right wheel seat. Axle is then placed on centers and chuck is tightened on wheel seat in mesh with a driving gear in the bed. Journals are burnished by specially constructed rollers mounted on Timken bearings. These rollers are opposed and float as a unit, thus relieving the centers, carriages and bed from side pressure. Three sizes of chucks are provided for handling axles having 3¾x7-in. to 6½x12-in. journals. Production, allowing for two passes, on the average size axle is claimed to be approximately seven axles per hour.

The Betts-Bridgeford end-drive and center-drive axle lathes have been improved by adding hardened steel ways and renewable bronze carriage linings. These machines are designed for rough and finish turning locomotive axles over their entire length, or rough and finish turning similar heavy forgings. Headstocks and tailstocks are equipped with Timken roller bearings. Center-drive lathes can be used for roller-burnishing journals.

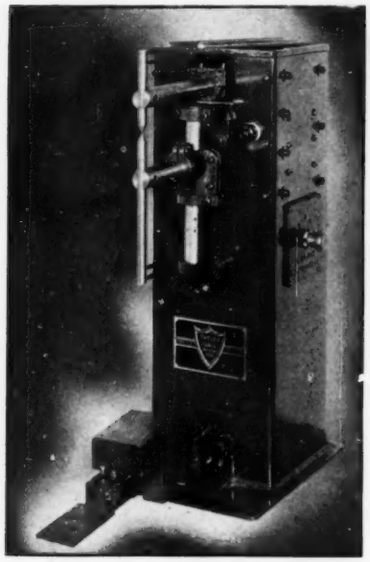
Automatic cycle operation has been developed for the Betts hydraulic feed car-wheel borer. After the operator loads the wheel on the table he starts the machine. This automatically tightens the chuck jaws and starts the automatic cycle of operation. In this cycle the boring bar travels down by rapid traverse to the beginning of the roughing cut, changes to roughing feed, again changes to finishing feed, dwells for the chamfer cut, returns by rapid traverse and stops. This machine is suitable for all sizes of cast-iron and steel car wheels up to 42 in. diameter. It can be arranged to chuck 48-in. wheels if required.



"Spiralink" Conveyor Belt

General Alloys Co., 409 West First St., Boston, Mass., manufacturers of heat, corrosion and abrasion resisting alloy castings, offer the "Spiralink" conveyor belt for use in industrial furnaces for temperatures up to 2,000 F. Design of the belt is such as to equalize the load on connecting pins, permitting the use of a light-weight design without danger of breakage. Openings in the top surface are small, giving the effect of a solid conveyor surface. High strength is obtained by using "Q-Alloy" metal in the individual castings. Weight of a com-

plete belt is approximately 15 lb. per sq.ft. for average loads and belt widths. No machining is performed in the assembly of the belt, and the width of the belt is composed of a single casting.

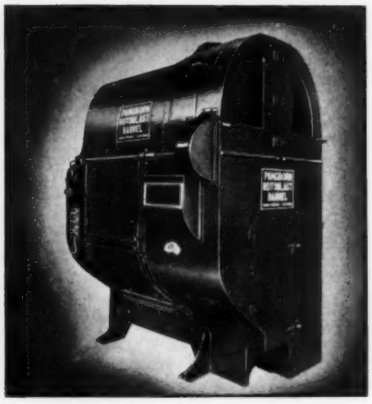


Taylor-Hall Spot-Welding Machine

Taylor-Hall Welding Corp., 99 Hope Ave., Worcester, Mass., is offering the Model D spot welding machine in 10, 17 and 25 kva. sizes. Horns and electrodes of these machines are water cooled and pressure is adjustable from 25 to 250 lb. Movement of upper electrode is in a vertical plane and may be up to 2½ in. when necessary. Transformer and upper horn assembly are used as the pressure unit with an easily adjustable counterweight for light and medium work. This obviates the use of a spring for obtaining welding pressures.

Pangborn Rotoblast "Rocker" Barrel

The "Rotoblast Rocker Barrel", announced by Pangborn Corp., Hagerstown, Md., and first shown at the Foundrymen's Show in Milwaukee, on May 3, is a general-purpose blast barrel, designed for cleaning flat, mixed, long and fragile work. Barrel consists of the Rotoblast unit, a folding conveyor drum, the abrasive cleaning system and the control mechanism. Rotoblast unit is mounted on top of the cabinet above the drum center, in such a position that the



wheel and blast stream are parallel with the axis of the drum. The drum consists of two heads and a cylindrical portion of the shell. Folding conveyor sections are hinged to the shell proper and the shell is lined with abrasive resisting wear plates.

Loading and unloading is through a counterbalanced double door. An automatic abrasive cleaning system, built integral with the machine, consists of a series of screens which remove the coarse refuse. The screened material, abrasive, fines and dust, flows over inclined stratification plates which take out all the dust and fines. Drum load capacity of the No. 1 unit is 6 cu.ft.; for the No. 2 unit this capacity is 12 cu.ft.

Langelier Capscrew Drilling Machine

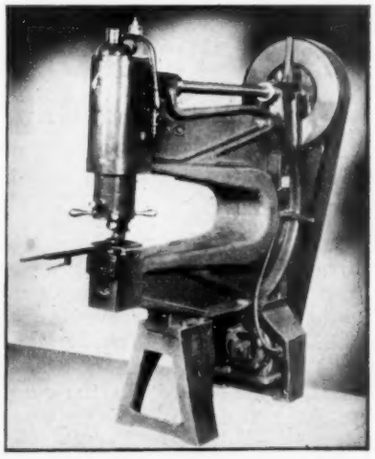
The continuous type capscrew drilling machine shown is constructed with four spindles and chucks the work in spring collets. Spindles are mounted horizontally and the work is rotated, instead of revolving the drills. This machine, designed and built by Langelier Mfg. Co., Providence, R. I., is equipped with driving motors for both the chuck and carrier drives, and a pump for supplying cutting lubricant to the drills and taps.

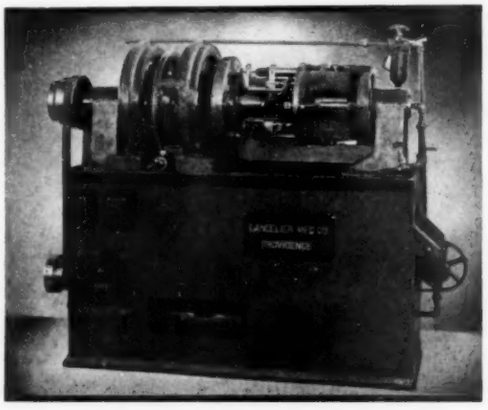
The carrier rotates about fixed cams which automatically open and close the chucks, eject the drilled screws, and also stop the rotation of the collets at the loading position. Carrier is driven through a worm and wheel, and a three-step cone pulley is mounted on the drive shaft so that the speed of the carrier can be changed when required. Driving shaft for the chucks is also equipped with a three-step cone pulley, providing speeds of 1,400, 1,800 and 2,500 r.p.m. at the collets. Drills are fed by means of a fixed cam located at the end of the machine. A section of this cam is interchangeable to provide different depths of drilling for ¼, 5/16, ⅜, 7/16 and ½-in. screws. Each spindle has a receding steadyrest carrying a drill guide bushing for accurately starting the tools in the work. Production obtainable ranges from 2,400 per hour in the ¼ in. size to 1,600 per hour in the ½ in. size.

Savage Improved Nibbling Machines

Improvements in the line of nibbling machines manufactured by W. J. Savage Co., Inc., Knoxville, Tenn., include direct over-center drive, totally inclosed head, one-piece revolving head, and increased strength in the main frame. The totally inclosed head protects both the working part and the operator and provides means for better lubrication.

These nibbling machines are rated to cut from ⅛- to ½-in. thick sheet metal and have a range of throat depth from 8 to 36 in. Alloy steels are easily cut.





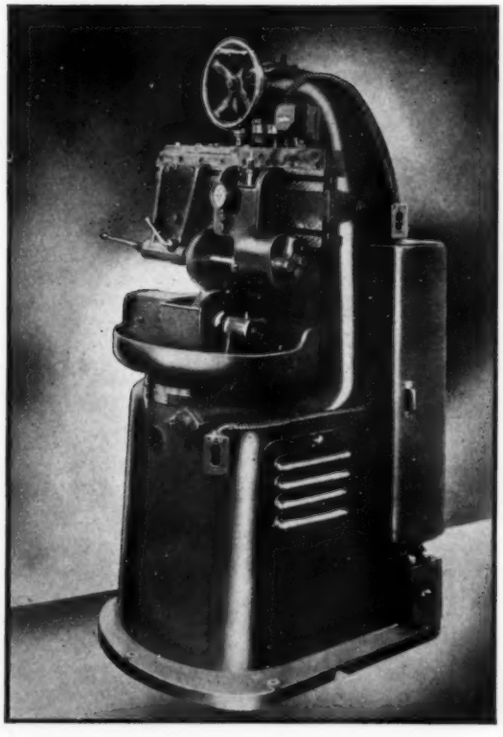
Guardian Counter

A solenoid-operated counting unit, capable of handling up to 400 impulses per min. without overheating or sticking, is offered by Guardian Electric Mfg. Co., 1621-27 West Walnut St., Chicago, Ill. Operating mechanism is inclosed in a case for protection against dust and dirt. These units are designed for operation at 6 to 110 volts d.c., and 24 to 220 volts a.c. and are available with standard five-figure, Veeder-Root counters of either the reset or non-reset type. These units can be placed in any desired location.

National Type GLF Gear-Lapping Machine

The Type GLF gear lapping machine, recently announced by National Broach & Machine Co., Shoemaker & St. Jean Sts., Detroit, Mich., is designed for the correction of helix angle, eccentricity, involute curvature and tooth spacing in gears. "Crossed-axes" principle of lapping in which the lap gear drives the work gear, is used. Rotation of the lap in one direction processes one side of the work gear tooth, changing the direction of rotation processes the other side. Machine will accommodate gears up to 8-in. diameter. Maximum lap face is 3¾-in.

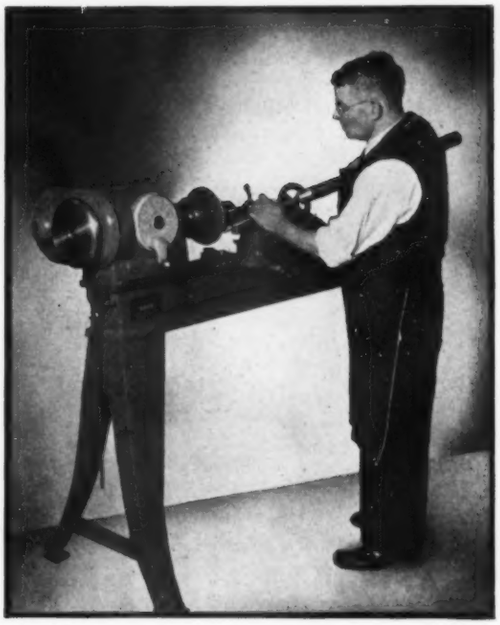
Angle between work gear spindle and lap spindle is readily adjustable, as the lap is mounted on the machine table which has a 15 deg. swing and a vernier adjustment for close setting. Work gear spindle is carried on a cross slide which automatically reciprocates the work gear across the face of the lap. This movement is actuated and controlled hydraulically, making any lapping cycle easily available. Length, speed and number of strokes may be varied at will. Any given number of strokes may be made before the direction of lap rotation is changed, likewise any number after the change is made. The entire cycle is automatic, consequently each individual unit is processed uniformly. A hydraulic brake, acting in conjunction with the work gear spindle, is used to load this spindle and provide the necessary pressure between the teeth of the lap and those of the gear. This pressure can be accurately regulated to suit requirements.



"Hastelloy B" Alloy

Haynes Stellite Co., 30 E. 42nd St., New York, N. Y., has announced development of "Hastelloy B" for use under extremely severe conditions of corrosion. This alloy has been produced primarily for service in equipment handling hydrochloric acid in all concentrations and at temperatures up to and including the boiling point. It is claimed to stand up well in sulphuric and phosphoric acids, acetic and other organic acids, and in non-oxidizing acid chloride solutions. Penetration of a 20 per cent hydrochloric acid at the boiling point is at the rate of only 0.0016 in. per month.

"Hastelloy B" is composed of nickel, molybdenum and iron. Physical properties are comparable to those of a good grade of alloy steel: tensile strength in the forged, rolled and fully annealed state being about 135,000 to 140,000 lb. per sq.in. with an elongation of 44 per cent in 2 in.

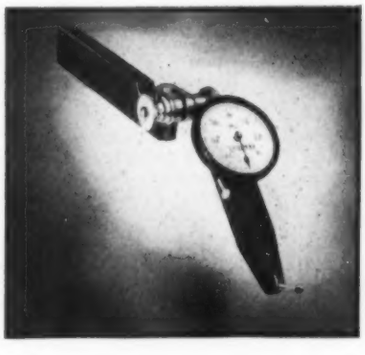


Oliver Metal-Spinning Lathes

Oliver Machinery Co., Grand Rapids, Mich., is offering a line of variable-speed, unit-type, motor-driven, metal-spinning lathes for spinning sheet steel, copper, bronze, brass, aluminum, and similar metals. These lathes are available with 12-, 16-, 20- and 24-in. swing. Each lathe is furnished with legs which bring the top of the lathe bed to a height of 36 in. from the floor. Distance between centers ranges from 24 in. for the 12-in. lathe, up to 37 in. for the 24-in. lathe. A hand feeding carriage with a compound swivel rest can be furnished.

Federal "Model 2" Dial Indicator

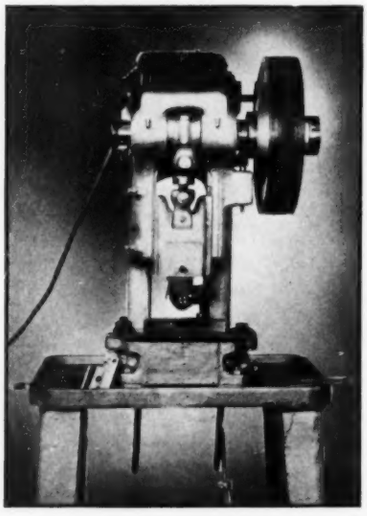
Designed for use with surface gages, height gages or in tool posts the "Model 2" test indicator with universal bar, offered by Federal Products Corp., 1144 Eddy St., Providence,



R. I., is graduated to read to 0.0001 in. Movement consists of a combination lever and direct contact crown gear so that friction and wear is reduced to a minimum. Range is 0.008 in. Universal bar is ¼ x ½ x 3-in. long. Adapter rods can be furnished.

Numberall Wire Numbering Press

Developed by Numberall Stamp & Tool Co., Inc., 379 Huguenot Ave., Huguenot Park, State Island, N. Y., automatically to mark pieces of test wire, this power press is equipped with an automatic numbering head which stamps consecutively $\frac{1}{16}$ in. figures in a vertical position on the wires. Three or four wheels are used in the numbering head to stamp figures up to 999 or 9,999 respectively. The bolster, with V-blocks, is designed to take wires from $\frac{1}{16}$ to ½-in. diameter. Head can also be furnished to duplicate or triplicate numbers stamped.



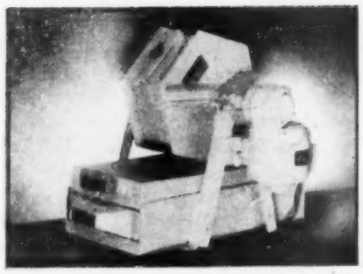
Durez No. 1590 Molding Material

General Plastics, Inc., North Tonawanda, N. Y., is offering Durez No. 1590, a phenolic molding material having an impact strength of 0.7 (A.S.T.M.). This material is claimed to have five times greater impact strength than standard molding materials.

Durez No. 1590 molds and performs easily, has a relatively low bulk factor and, in molded form, has a somewhat rippled surface.

Belke "Small-Lot" Burnishing Barrel

The small lot burnishing barrel, offered by Belke Mfg. Co., 947 N. Cicero Ave., Chicago, Ill., is entirely self-contained. Cylinder is lined with hard rubber and is 6 in. wide by 10½ in. diameter across the flat sections. Work pan has perforated bottom and balls are quickly separated by shaking back and forth. Ball container pan has drain with fine screen so water flows off. This pan is equipped with pouring lip so balls can be easily returned to cylinder without shoveling. This burnisher is claimed to be particularly efficient for small-lot jobs since it eliminates the necessity of using a larger machine.

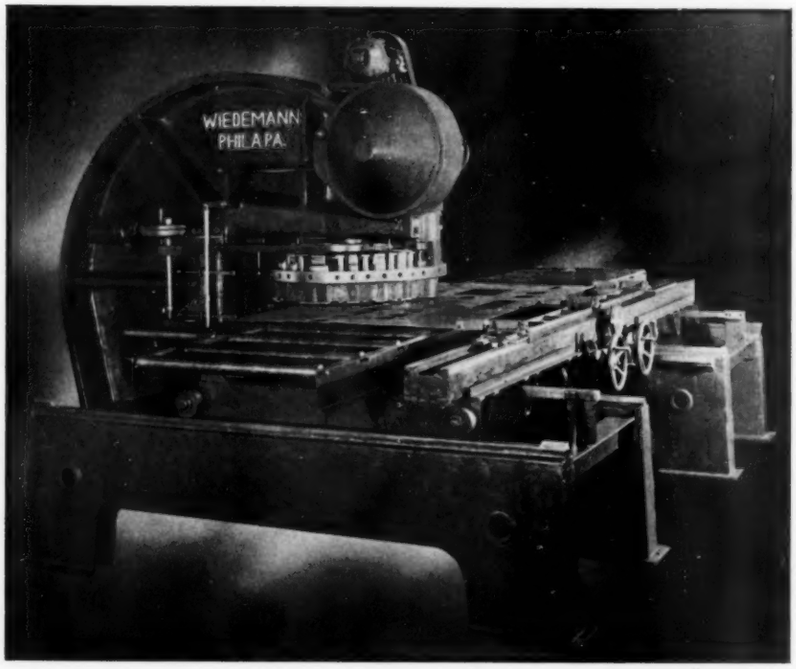


Wiedemann Model R-7 Turret-Type Plate Punching Machine

Model R-7 turret-type plate punching machine manufactured by Wiedemann Machine Co., 1815 Sedgley Ave., Philadelphia, Pa., is similar in design but of larger capacity than standard turret punching machines. It is equipped with an indexing work table which holds the sheet in position and locates it in a predetermined position under the punch. This table is mounted on rollers, which run on the ways of the floorstands and is free to move traversely by means of a rack and pinion. A scale is attached to one of the floorstands, and an indicator on the table denotes its location. The upper front edge of the table carries a slide which is free to move in a longitudinal direction and is operated through a rack and handwheel. A scale is attached to the slide and is graduated in sixteenths of an inch.

No set-up of individual punches and dies is required, and no templets are necessary to locate the various shaped holes in their proper place in a sheet. Only one handling of the sheet is necessary to complete the work to be duplicated from predetermined data.

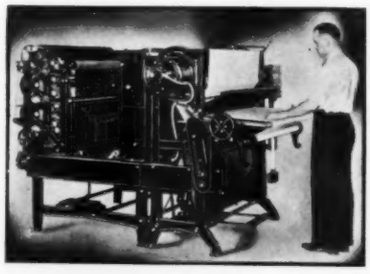
A sheet is placed on the table against stops when the pointers on the traverse and longitudinal scales are at zero. This locates one corner of the sheet under the center of the



punch and is the base point for all subsequent movement of the work.

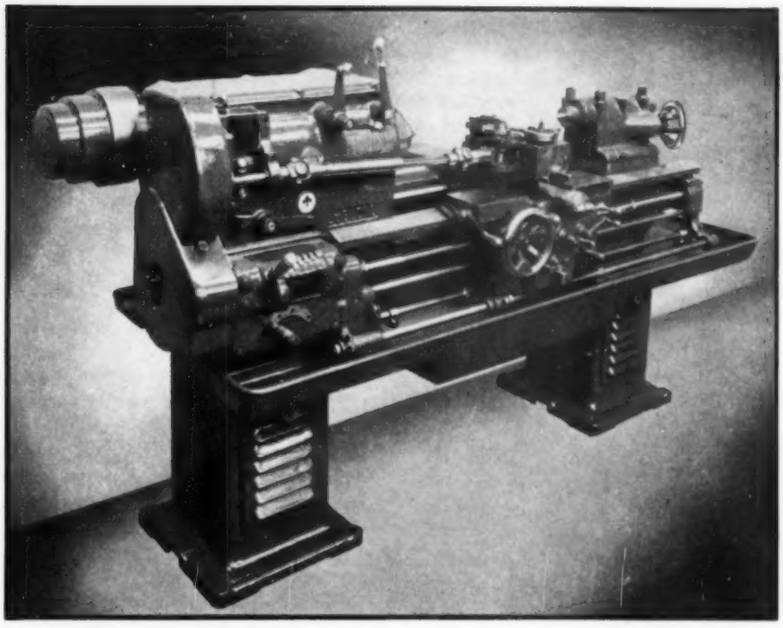
A punch sheet is compiled for each standard panel. Punch number and the two ordinate dimensions are listed. This data sheet is wrapped on a drum attached to the table of the press and held in position by several springs. A ratchet on the drum engages with a pawl attached to a pull rod which in turn is attached to the press tripping lever. Each time the press is tripped, the drum turns the width of one line on the punch sheet, thus presenting a new set of figures at the window in the cover which hides a portion of the sheet. The cover is free to slide on a rod so that each column of figures can be brought into view. All the operator does after locating a sheet is to move the table according to ordinate dimensions given for each punched hole. When a hole has been located and the correct punch selected in the turret the operator trips the machine with a lever.

The Model R-7 press is rated at 75-ton capacity, has a 54 in. throat and a 50 in. diameter turret. The turret has provision for carrying 32 punches and will punch 5½x6 in. holes through ¼ in. thick material. A smaller press, designated as the Model R-6, is rated at 40 tons, has a 30 in. throat, a 30 in. turret, and has provision for 28 punch stations. This press will punch 2¼ in. diameter through ¼ in. thick material. All controls are located at the front of the machine and in easy reach of the operator.



Revolute No. 3H Blue-Printer

Paragon-Revolute Corp., 77 South Ave., Rochester, N. Y., offers the No. 3H automatic blueprinting machine for rapidly exposing, developing and drying blueprints in one continuous operation. This machine is made in 42 and 54 in. widths for operation with 220 volts, a.c., or d.c. Dryer can be equipped for gas or electrical heating. Machines are thermostatically controlled.



LeBlond Relieving Attachment For Toolroom Lathes

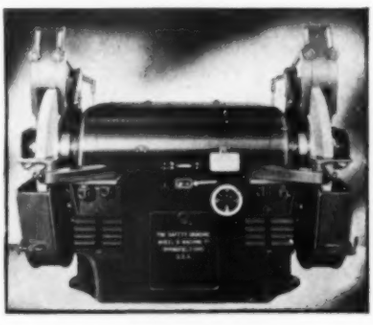
An improved fully-universal relieving attachment for use with toolroom lathes is offered by The R. K. LeBlond Machine Tool Co., Cincinnati, Ohio. Any required relief from zero to ¼ in. can be obtained with the use of only two cams. The majority of work within the range of the attachment can be handled without angularity of the knuckle joints. With this attachment external, cylindrical, internal, and, side, angular and spiral relief are easily and accurately accomplished. No supporting blocks or additional knuckle joints are necessary to change from external or internal or end relief. For spiral relief it is only necessary to make a simple adjustment of the change gear combinations. With the built-in coarse-threading attachment, furnished with the relieving attachment, most of the change gear combinations can be obtained directly from the quick change box.

Driving mechanism is rigidly attached to the headstock and in no way interferes with the operation of the lathe for ordinary work. Drive from the gears on the end of the for ordinary work. Drive from the gears on the end of the lathe is through a telescopic shaft to the actuating mechanism on the tool slide. Adjustment for relief is quickly made, the follower cam being graduated so that the amount of relief can be accurately set. The tool slide is furnished with a substantial three-position tool block, adjustable laterally on the slide by fine-threaded adjusting screws.

"Rite Speed" Heavy-Duty Floor-Stand Grinder

The Safety Grinding Wheel & Machine Co., Springfield, Ohio, has recently anounced a "Rite Speed" floor-stand grinder for heavy duty work. This grinder is provided with an infinite number of gradual increases of speed, so that peripheral speed can be maintained as the wheels wear away.

The 30-in. machine will take wheels up to 3 in. thick and is powered with a 20-hp. motor. This machine will maintain a peripheral speed of 9,000 to 9,500 surface ft. per min. until the wheel is worn away to 18½ in. diam-

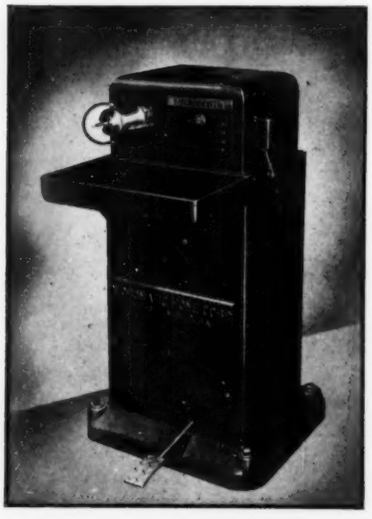


eter. Beyond this point there is no increase in speed. The 24-in. machine will take wheels up to 3-in. thick and uses a 15-hp. motor.

Micromatic No. 1 "Microhoner"

It is claimed to be possible to hone bores as small as ¼ in. diameter on a production basis with tolerances for roundness and straightness held to 0.000025 in. when using the No. 1 "Microhoner" announced by the Micromatic Hone Corp., Dubois St., at Horton Ave., Detroit, Mich. This honing machine will handle a diameter range from ¼ to ⅞ in. with a maximum length of 2¾ in. for smaller diameters up to and including 7½ in. for large diameter sizes. Production of up to 180 to 200 pieces per hour is claimed when removing 0.0007- to 0.001-in. stock from a ground hole in hard metal. Reamed, broached, or precision bored holes in cast iron or soft steel can be honed at the rate of 125 to 150 pieces per hour when removing from 0.001- to 0.002-in. stock.

This machine incorporates the principle of a wobble plate to obtain



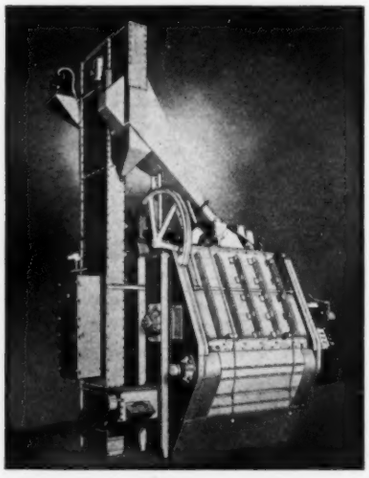
a high speed, mechanical reciprocating motion. This, combined with rapid rotation, accomplishes the required spiraling or helical travel of the abrasive to produce a crosshatched honed finish. Any desired variation of crosshatch, or relative speeds of operation can be obtained by drive pulleys. Operator's hands are free for holding the work or for making adjustments as foot pedal control is provided for starting and stopping the machine. Honing sticks are held rigidly against the bore wall by a controlled, constant pressure which is regulated by a caged feed spring independent of the influence of the operator.

Abrasive sticks are mounted in die-cast holders which are easily replaced. These bodies are available for every ⅛ in. increase in diameter of bores.

The Microhoner is equipped with a coolant tank, pump and an efficient filter, with the discharge nozzle piped to the honing spindle head. Standard motor equipment includes a ¼ hp., 60 cycle, 3 phase electric motor. Electric gaging equipment can be applied where the hole is to be held to close limits for roundness and straightness.

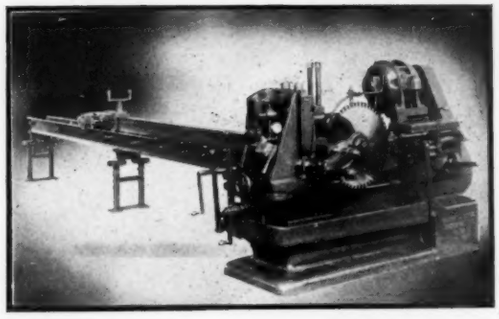
A.F.E. Wheelabrator 48x48-In. Tum-Blast

Larger than any equipment of this type previously offered, the 48x48-in. Wheelabrator Tum-Blast unit recently placed on the market by the American Foundry Equipment Co., 555 S. Byrkit St., Mishawaka, Ind., is designed primarily for heavy-duty service in cleaning reasonably compact castings and forgings weighing up to 300 lb. each. Unit has an operating load capacity of 20 cu.ft. Centrifugal force replaces compressed air in whipping steel abrasive onto



metal pieces being cleaned. A tumbling action gives complete exposure of all parts in the blasting zone; this is accomplished by means of an endless conveyor apron.

An auxiliary hopper and screw conveyor, installed in a pit beneath the machine, reclaims abrasive which rebounds beyond the conveyor.



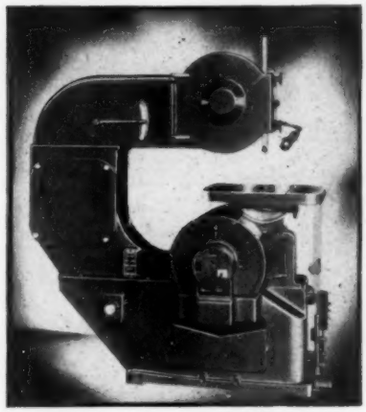
C.-B. Bar Feed

Special handling apparatus for square and rectangular bars that will grip a bundle of bars on the end and feed them all the way up to a saw blade has been developed by Cochrane-Bly Co., 15 St. James St., Rochester, N. Y. This apparatus is shown applied to the No. 55 sawing machine. Fixtures are designed to hold 40, ¼x2 in., or 20, ½x2 in. cold-drawn bars which are supported on rolls and held in the extended carriage. The stock carriage is fed forward by chain and sprocket operated by a crank handle.

Grob Type OS-36 Metal Bandsaw

Work up to 8¼ in. high can be sawed on the Type OS-36 open-end bandsaw offered by Grob Bros., Grafton, Wis. No brazing or welding of the saw band is required for internal sawing. Large throat is obtained by means of a third 20 in. diameter pulley mounted on a swivel block in the upright column of the frame. The saw band is driven positively, providing faster cutting.

Sawing table is tiltable in two directions and measures 24 x 28 in. Distance from floor to table is 47 in., and height over-all is 80 in. Floor space required is 24 x 60 in. Weight is 3,000 lb.



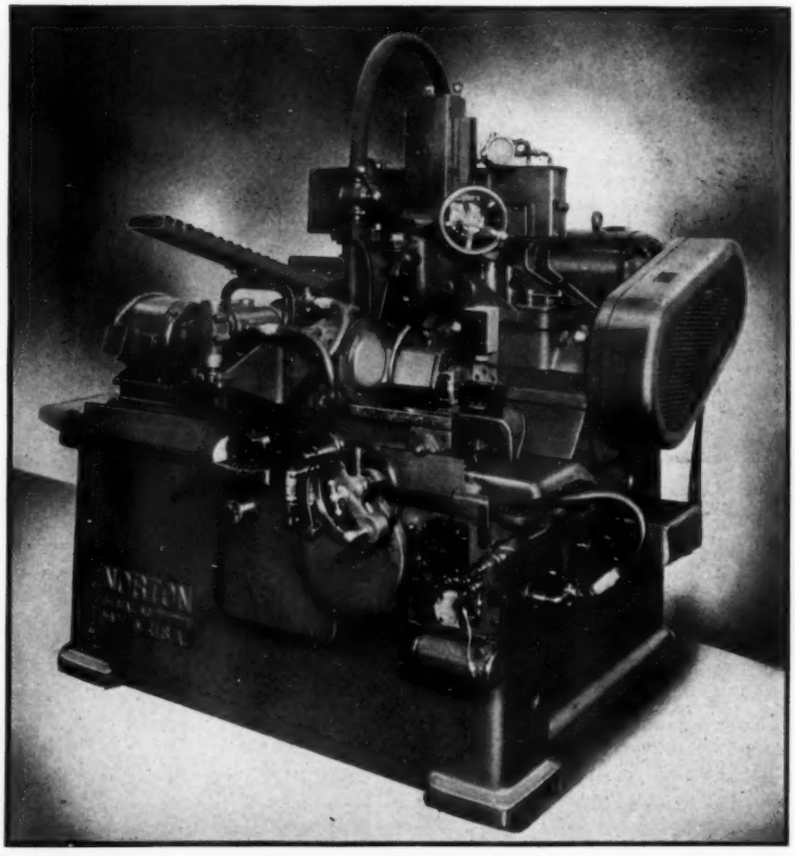
Norton Automatic 10-In. Type C Automatic Cylindrical Grinder

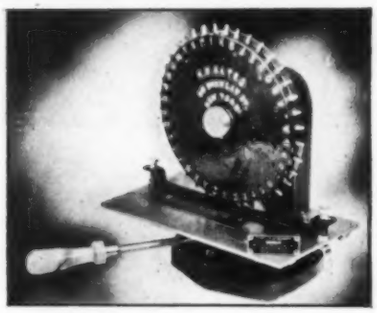
A wholly automatic arrangement of the 10-in. Type C cylindrical grinder is announced by Norton Co., Worcester, Mass., for plunge-cut grinding operations. This machine grinds cylindrical parts concentric with their axes in large quantities with a minimum amount of attention required from the operator. Manual work consists of keeping the machine supplied with work, compensating for wheel wear by means of a standard mechanism adjustable to 0.0001 in. and truing the grinding wheel when necessary to maintain the desired finish. Wheel truing mechanism is built into the wheel guard and is hydraulically operated.

Automatic grinding cycle includes placing the work in the holding and driving position, grinding to accurate size, releasing the finished piece and dropping it into a return chute. Regulation of the time required for the automatic cycle is by means of a hydraulic valve which may be adjusted at any time during the operation of the machine. Machine is so designed that failure of any mechanism to perform its functions will cause all other mechanisms to stop, thus automatically signalling the operator for attention.

Type of headstock, footstock and work-loading fixtures used with this machine vary according to shape and size of the work and the grinding requirements. A chute-type loading fixture is shown arranged for grinding steel bushings having internal splines. A hydraulically operated set of fingers at the bottom of the chute picks off the bushing to be ground, advances it between the centers of two live spindle synchronized work-heads while simultaneously removing the previously ground bushing and dropping it into the return chute.

Nominal capacity of the machine is 10 in. diameter by 18 in. long. The actual capacity, however, is determined by the work and the design of the work-heads and loading mechanism. A grinding wheel 24 in. diameter and up to 5 in. wide or 20 in. diameter up to 7 in. wide can be used. This wheel is driven by a constant-speed motor of 10 to 25 hp. mounted directly on the wheel slide. The work drive requires a ¾- or 1-hp. constant-speed motor and the drive for the hydraulic lubricating and coolant pumps uses a 3-hp. motor.





Bates Name Plate Stamping Machine

Name plates up to 8 in. long can be stamped on the stamping machine offered by H. O. Bates, 68 Barclay St., New York, N. Y. Single letters or figures are replaceable and extra sizes of characters can be furnished with each machine. Operation is simple, the impression being made with a swing of the handle. Table advances automatically after each impression. Spacing is adjustable. Both curved and straight lines can be stamped and special fixtures can be provided for curved lettering or numbering. Stamps ranging from ⅛ to ¼ in. can be used.

Specifications: Over-all height, 10 in.; depth from marking dies to back of table, 3 in.; automatic advance, 4 in.; maximum length of name plate, 8 in.

Burns Pink-Lime Polishing Compounds

Two grades of pink-lime polishing and buffing compounds have been announced by E. Reed Burns Mfg. Corp., 21-27 Jackson St., Brooklyn, N. Y. These compounds are a combination of crocus and lime and have been developed especially for color buffing on brass or copper where the finished surface is to be later plated in a bright nickel solution. It is claimed that the addition of crocus gives a deeper and higher color to brass or copper than is possible where a white lime is used for the coloring operation.

They are listed as "C-H Pink Glo-Lime" and "M-28 Pink Hi-Po-Lime."

St. John Portable X-ray Unit

Suitable for either shop or field work, the portable X-ray machine manufactured by St. John X-Ray Service, Inc., 30-20 Thomson Ave., Long Island City, N. Y., has sufficient power to penetrate 3 in. of steel in a one-minute exposure. This unit is mounted on a trailer chassis and can be moved wherever it is needed. Power is generated in a single tank unit which is connected by high-tension shock-proof cables with the shock-proof X-ray tube. The trailer cover can be utilized as a field darkroom.

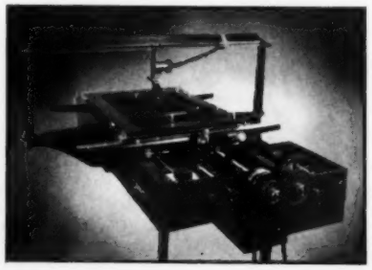
"Fast" Precision Oil-Film Bearing

The Fast Bearing Co., Hampden Ave. and 23rd St., Baltimore, Md., has announced a line of precision oil-film bearings that embody the features taught by Professor Osborne Reynolds' hydrodynamic theory of lubrication. These bearings are interchangeable in size with existing types of ball and roller bearings made to international standard dimensions. It is claimed that their life is unlimited as there is no metallic contact, the load being carried entirely on the oil film. Stresses in the bearing members are moderate. Each bearing functions as a self-contained centrifugal force feed pump creating a reliable and efficient lubrication system.

Fast's bearings are made in two types: (1) medium type 300 series cylindrical bearings, for radial loads, permitting axial float or expansion of the shaft — the lateral movement taking place within the oil film without resistance; and (2) medium type 1,300 series spherical or self-aligning bearings for thrust or location bearings in order to control the lateral position of the shaft as well as carry the radial load. In both types, the outer members or races are locked in a lateral position in the housing.

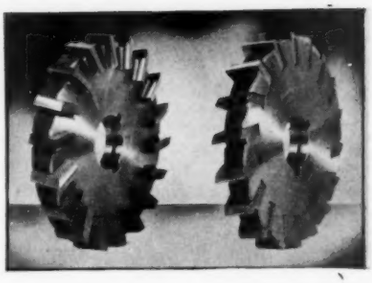
Mico 14x17-In. Measuring Engine

The 14x17-in. measuring engine announced by Mico Instrument Co., 10 Arrow St., Cambridge, Mass., can be furnished as a plate measuring device with the microscope underneath the carriage or it can be furnished with an overhead microscope. Microscope uses standard objectives so a wide range of magnification is possible. The basic machine can be used as a conventional single-coordinate comparator or the cross-slide can be furnished with a screw to convert the



device into a two-coordinate comparator of extreme range. It can also be used as the basis of a microdensitometer of either a visual or recording type.

Ball-bearing mounting of the carriage and screw is used to reduce friction to a minimum. These engines can be furnished with either English or metric screws. English screws are 20 threads per inch with dials reading directly to 0.0001 in. Longitudinal travel of the carriage is 17 in., cross travel is 14 in.

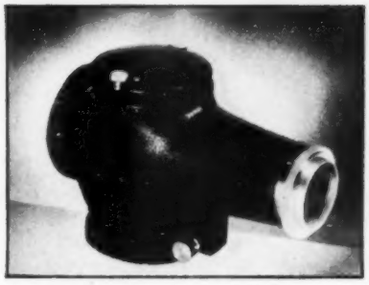


National Inserted-Blade Cutters

"Adjusto-Lock" inserted-blade milling cutters, announced by National Twist Drill & Tool Co., 6522 Brush St., Detroit, Mich., provide for positive locking of blades in any position and for universal adjustment of the blades. The interlock of blade and body is arranged so that the two members must be moved apart before any lateral movement can take place. Function of the locking wedge is that of holding the blade against its seat in the body. More than 300 separate anchoring points are provided per square inch of blade surface. It is possible to adjust these blades in any direction desired and to relock them solidly. Sizes of blade slots, blades and wedges have been standardized so that a minimum number of blades and wedges need be carried in stock.

Willson One-Piece Welding Helmet

Formed of one-piece of black vulcanized fiber and cut deeply to offer side protection to a point well back of the ear, the welding helmet announced by Willson Products, Inc., Reading, Pa., is said to be capable of withstanding hard shop use. Riveted, lapped-over seams or joints are eliminated and a smooth, round interior promotes air circulation. "Willson-Weld" 2x4¼ in. glass is standard in these helmets.



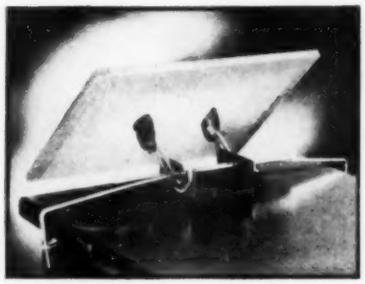
Mico Illuminators

Three high-intensity illuminators are announced by Mico Instrument Co., 10 Arrow St., Cambridge, Mass. The basic unit for each of these light sources is a well proportioned aluminum casting that provides a strong housing for the lamp and a focusing slide for the condenser. They are designed for use with microscopes, optical benches, oscillographs, galvanometers and other projection devices.

All three illuminators can be mounted on rods, holes being provided for mounting on clamp stands. Focusing of the condenser slide is positive, a helical groove in the tubing providing the adjustment. The "Micolite" unit uses a 50-watt tungsten lamp. Housing for this unit is well ventilated and will operate in any position. A mercury quartz lamp is used in the "Mico-Hi-Lite" unit giving a high-intensity beam. "Mico-Vi-Lite" unit is a powerful source of ultra-violet light, using a mercury quartz lamp with an ultra-violet filter in place of the glass condensing lens.

Westbrook Table Drawing Stands

Designed to attach securely to any table, the drawing stand offered by Westbrook Equipment Co., 10016 Greenview Ave., Garfield Heights, Cleveland, Ohio, combines portability and convenience with strength. Stand is attached to the table by use of a formed metal base and two rods. Height and angle of the stand can be adjusted to suit individual requirements.



Wagner Resilient Mounted Motors

Annular, resilient mountings are now available on ⅛- to 1-hp. repulsion-start-induction, split-phase, capacitor and polyphase types of electric motors manufactured by Wagner Electric Corp., 6400 Plymouth Ave., St. Louis, Mo. This type of mounting is claimed to have the advantage of assuring less vibration since the rubber mounting supports, which absorb the vibration, are as close to the shaft center as possible. Motor bases are of sheet-steel and are shaped in the form of a cradle. Large rings of rubber which support the motor are vulcanized to inner and outer steel rings, affording padded resistance against vibration.

G. E. Automatic Electric Gluepot

Quick production of workable glue and careful regulation of glue temperature are the advantages claimed for the automatic electric gluepot announced by General Electric Co., Schenectady, N. Y. This gluepot is designed to heat rapidly until a temperature of 140 to 150 F. is obtained. This temperature range is set at the factory and is accurately and automatically maintained.

The gluepot consists of a removable copper container for holding the glue, a heated copper jacket in contact with the glue container, and an outer protective casing of heavy steel. It has a capacity of two quarts and is available for 115- or 230-volts, a.c. or d.c. service.

Reed-Prentice No. 2U Universal Milling Machine

The No. 2U universal milling machine, offered by Reed-Prentice Corp., Worcester, Mass., is adapted for general tool and die work. The self-contained motor-driven head is designed for milling, drilling and boring at all angles. Head can swivel to any angle parallel with the longitudinal feed and any angle up to 60 deg. can be obtained in a plane parallel to the cross feed from center toward the column. This angle is 30 deg. from center toward the front of the machine. Quill has a travel of 3⅓ in., and is provided with a micrometer depth gage. Positive quill lock is provided. Rack and worm feed is provided for drilling and boring. Six spindle speeds range from 275 to 4,250 r.p.m. The circular table is 15 in. diameter and is graduated to 360 deg. Four ⅝-in. T-slots are provided in the table.

Specifications: longitudinal feed, 16 in.; cross feed, 11 in.; vertical feed of knee, 15 in.; working surface of table, 20¼x8⅞ in.; net weight, approximately 1,500 lb. Space occupied is 40 in. long by 34 in. wide by 70 in. high.

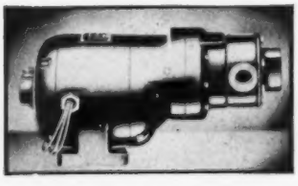
"Geneva" No. 125F Dial Indicator

The No. 125F Geneva dial indicator offered by Chicago Dial Indicator Co., 180 N. Wacker Drive, Chicago, Ill., features a simple movement in which a lever arm is used instead of a combination of gears. Case is dustproof and the rotating adjustable dial is fitted with a positive locknut. This indicator reads to 0.001 in. and has a 0-50-0 scale. Plunger has $\frac{1}{8}$ in travel. Instrument is 2 in. in diameter and $\frac{1}{16}$ in. thick, not including the curvature of the crystal, which is non-breakable.

B.&S. Rotary Geared Motorpumps

Rotary geared Motorpumps, offered by Brown & Sharpe Mfg. Co., Providence, R. I., are now made to run in one direction only, either right-hand, or left-hand, the hand being determined by the side of the pump on which the discharge is located when viewed from the motor end. A mechanical seal is now used in place of the packing used in the previous design.

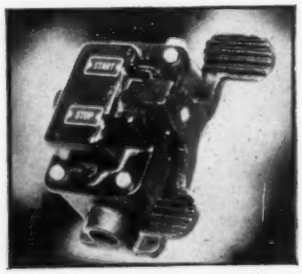
Pumps No. 101, No. 102 and No. 103 are available with 3-phase motors,



both in 220 and 440 volts, 60 cycle, in addition to previous listings. Similarly, the No. 204 centrifugal motorpump is now furnished with a 3-phase, 50-cycle, 220-volt motor.

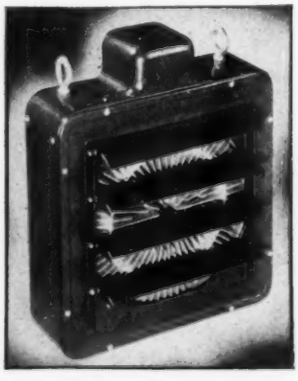
G. E. Foot-Operated Watertight Switch

A treadle-operated, watertight switch, designated as Type CR2940-2A18, is offered by General Electric Co., Schenectady, N. Y., for installations where the operator must have both hands free while starting or stopping a machine. This device is claimed to be especially suitable for use in damp or wet locations. It is available either with a single-action or a double-action treadle.

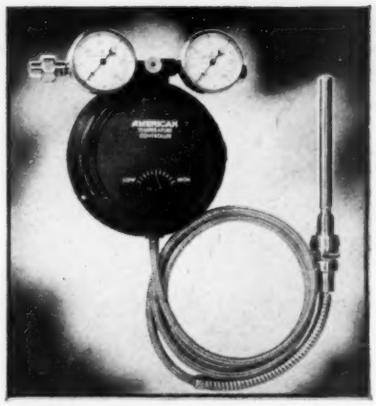


"Electromode" Model IBN Heater

The Electric Air Heater Co., Division of The American Foundry Equipment Co., 555 South Byrkit St., Mishawaka, Ind., is offering the Model IBN "Electromode" industrial heater. Heat source is a cast aluminum grid which has been poured around a calrod heating element.



This construction is claimed to eliminate all hot wires and dead air space, assuring safe operation at all times. A motor driven, four-bladed aluminum fan, running in a graphite-impregnated bronze bushing dissipates heat from the grid and circulates the warm air. Heat can be directed wherever it is needed by moving adjustable deflectors. Heater may be suspended from the ceiling or fastened to a wall with angle braces.



American Type 2426 Controller

A wide-range non-indicating controller, Type No. 2426, has been announced by American Schaeffer & Budenberg Div., Consolidated Ashcroft Hancock Co., Inc., Bridgeport, Conn. Though housed in a small 4½ in. case, this instrument for controlling temperature and pressure is designed to replace hand-control units. Unit operates on air pressure of 15 lb., and has a throttling range of from 1 to 15 per cent. Temperature type has a graduated range from —30 to 500 F. Pressure type has a graduated range of from 15 to 500 lb.

Dodge Cushioned Bronzoil Bearing

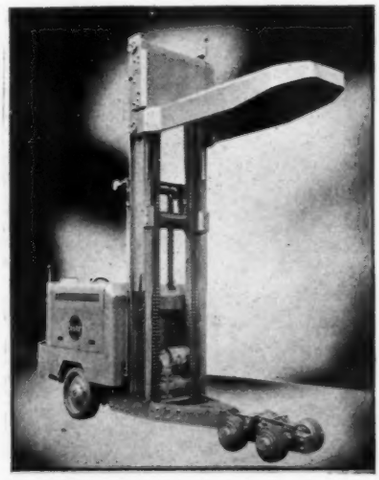
The cushioned-bronzoil bearing offered by Dodge Mfg. Corp., Mishawaka, Ind., has been developed to meet the exacting conditions encountered in fan and blower service. A thick band of durable synthetic rubber cushions vibration resulting from unbalanced rotors or couplings, and absorbs sounds developed by rotating parts. This band, which incloses the inner unit, is oil proof, is not affected by age or most chemicals and will withstand temperatures as high as those of superheated steam. The self-oiling composition bronze bushing supports the shaft on a thin automatically controlled film of oil. Bearings are self-aligning. Pillow block units are available for shafts ranging from ¾ to 1¼ in. diameter.

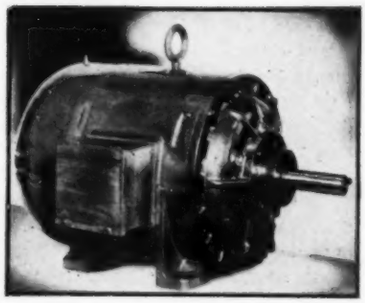
American Any-Angle Dial Thermometer

American Schaeffer & Budenberg Div., Consolidated Ashcroft Hancock Co., Inc., Bridgeport, Conn. offers a line of any-angle dial thermometers claimed to have the accuracy of high grade glass thermometers and provided with an adjustment whereby the dial can be tilted to the angle of greatest visibility. They are available in 4½- and 6-in. dial sizes and have miscrometer adjustable pointers. Capillary tubes and bulbs are of stainless steel.

Baker Type HH-5 "Hy-Lift" Truck

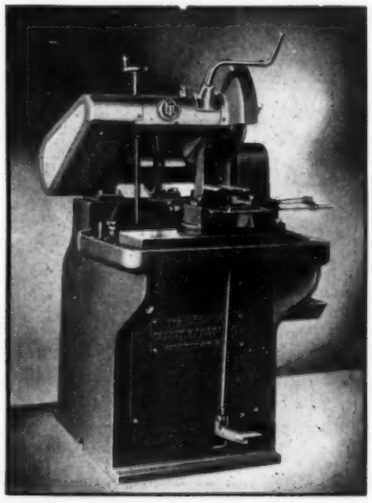
The Baker-Raulang Co., 2168 W. 25th St., Cleveland, Ohio, has announced the Type HH-5 telescoping "Hy-Lift" tiering truck of 5-ton capacity. This truck permits tiering skids to extreme heights while retaining a nested height low enough to enter a standard box car. Nested height is 88 in. and maximum lift of the platform is 106 in. above the floor. Platform of the truck allows standard practice as to dimensions, being 26½ in. wide by 54 in. long.





Westinghouse "CS" Fan-Cooled Motors

Motor frames of the dual-ventilated, fan-cooled Type CS squirrel-cage motors, offered by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., contain two separate sets of air ducts, one internal and one external. These ducts are separated by a common wall. An internal fan on the rotor circulates warm air through the internal ducts, the walls of which are cooled by the external fan blowing large volumes of cool air through the external ducts and providing rapid transfer of heat from the motor.



Cincinnati Abrasive Cut-off Machine

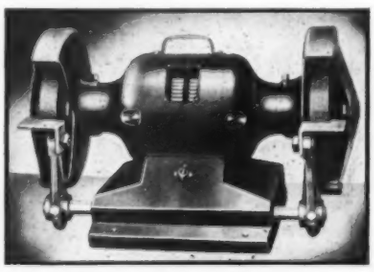
The Cincinnati Electrical Tool Co., Madison & Edwards Roads, Cincinnati, Ohio, has announced a wet-abrasive cut-off machine suitable for straight or angle cutting of practically any material encountered in general manufacturing. This machine is suitable for straight or angle cuts in solids up to 2¼ in. diameter or tubing up to 3½ in. diameter, the same vise being suitable for the various cuts. In cutting angles up to 45 deg., maximum capacity is 2¼ in. Graduations on the table make angle-cutting convenient. Coolant system consists of a ¼-hp. direct motor-driven centrifugal pump with tank, piping and control valve. Spindle is driven by multiple V-belt from a 7½-hp. drip-proof motor mounted in the pedestal.

"Ideal" Washer Punch

Intended for use in punching fiber, steam packing, straw board, asbestos, leather, felt, cork, rubber, bakelite, mica and similar materials up to 1/16 in. thick, the washer punch announced by Ideal Commutator Dresser Co., 1439 Park Ave, Sycamore, Ill., has 18 hardened dies, ranging from ⅛ to 1⅜ in. diameter. It is possible to obtain over 150 different washer combinations.

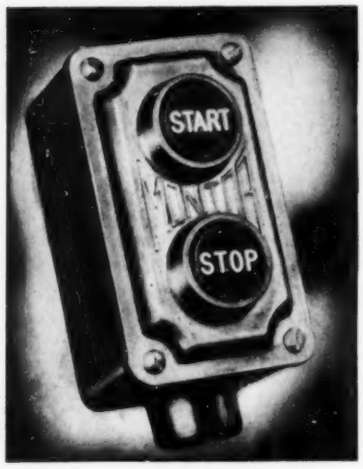
Diehl ½-Hp. Electric Grinder

Motor for the Diehl heavy-duty ½-hp. grinder is especially designed for this service. Marketed for general grinding and polishing operations by Diehl Mfg. Co., Elizabethport, N. J., this machine has a substantial cast-iron base arranged for fastening the grinder firmly to bench or table. Adjustable steel tool rests may be set in any grinding position to compensate for wheel wear. Heavy steel



guards afford protection to the operator.

Specifications: height, 10⅞ in.; length, 19¼ in.; width, 11½ in. Net weight, 65 lb. Standard units are designed for 110 volts, 60-cycle, single-phase a.c. operation.



Monitor Pushbutton Control Station

Box and cover of this pushbutton control station, recently announced by Monitor Controller Co., Baltimore, Md., are die cast. Pure silver contacts are mounted on a molded bakelite base. Wiring connections are made by removing the cover, without disturbing conduit connections.

Racine "Multi-Chron" Chronograph Timers

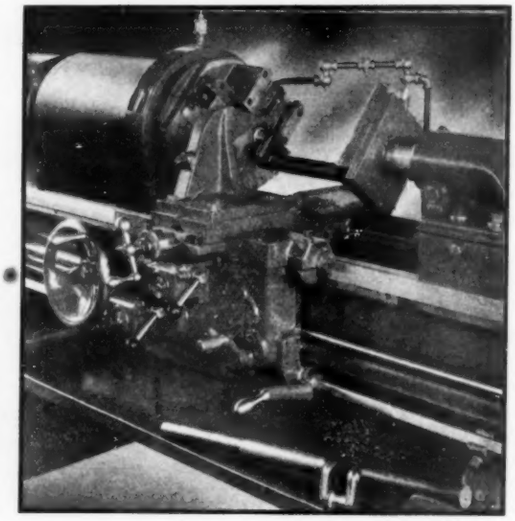
A line of Racine "Multi-Chron" wrist chronograph timers, introduced by M. J. Stillman Co., Inc., 116 South Michigan Ave., Chicago, Ill., combines a 15-jewel timepiece for recording time of day with the chronographic features of a sweep hand registering fifth seconds or decimal minutes. Cases of these watches are of Firth stainless steel, and movements are equipped with "Nivarox" hair springs and "Glacidur" metal balances, making them non-magnetic and minimizing expansion and contraction. Double lugs on either side of the crown allow for "take-out" time for interrupted observations and permit continuation of the sweep-hand movement without returning this hand to zero. When the sweep hand is in motion, the zero throwback lug is automatically locked, thereby preventing accidental returning to zero. One of the available models has computations on the dial which may be used for ascertaining production per hour, miles per hour, or the timing of any operation in terms of hourly capacity, production or speed.

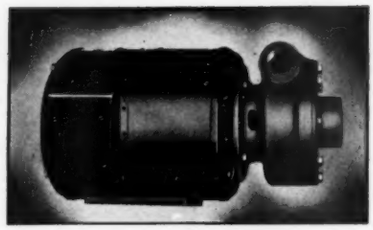
M & W "Durheat" Air-Drying Lacquers

"Durheat" lacquers, offered by Maas & Waldstein Co., 420 Lexington Ave., New York, N. Y., have been designed for finishing electrical equipment and other products normally subjected to elevated temperatures. This line of clear and pigmented air-drying lacquers is claimed to retain flexibility, color and adhesion indefinitely at temperatures up to 300 F.

Crankshaft Tooling for Reed-Prentice Lathe

Tooling for single-throw crankshafts, such as are used extensively in textile machinery, is available for use with standard 16 in. lathes manufactured by Reed-Prentice Corp., Worcester, Mass. This tooling setup has capacity for shafts ranging from $1\frac{9}{16}$ to $3\frac{1}{2}$ in. diameter and a maximum throw of $4\frac{11}{16}$ in. A minimum throw of $1\frac{13}{16}$ in. can be turned. Chuck has capacity for $27\frac{3}{4}$ in. length of shaft. Adjustment on both chuck and tailstock for throw of crankpin is by micrometer dial. Crankpins ranging from $1\frac{9}{16}$ in. to $3\frac{1}{2}$ in. diameter can be turned. Tailstock spindle is provided with ball bearing and a micrometer stop is provided on the bed for positioning the tool for starting a cut. An automatic stop operates at the end of the cut.





Pioneer Horizontal Coolant-Pump

An open-impeller type horizontal pump designed for coolants and lubricants has been announced by The Pioneer Engineering & Mfg. Co., 8316 Woodward Ave., Detroit, Mich. These pumps are direct-connected to ball-bearing, moisture-proof electric motors. Although normally installed in a horizontal position, this type of pump may be set vertically if desired.

"Zetyl" Plating-Rack Insulating Gun

"Zetyl" is a synthetic gum in liquid form developed by Nelson J. Quinn Co., 417—13th St., Toledo, Ohio, for insulating plating racks. It is used cold, just as it comes from the can, and is applied with a brush, spray gun or by dipping. This liquid gum is recommended for insulating plating racks for plating in nickel, copper, silver, zinc and cadmium. It is claimed to be particularly effective for use on chrome racks. It can be applied directly to the rack or the rack can be wound with thin cotton tape and the material applied over the tape. "Zetyl" is claimed to withstand the action of all acids and alkalies with the exception of hot concentrated nitric acid.

Round Table

What Price Spare Parts?

"Figuring again, Al? You must use up a lot of scratch paper. What's troubling you now?"

"No special trouble, Ed. I'm just planning a way of taking care of the cost of handling spare parts, or repair parts, or extras, or whatever you want to call them."

"Don't see how that takes any special planning. You know what it costs us to make them."

"Sure thing, Ed. But there's a lot more to it than that."

"I don't see why. You add your overhead and profit and that's your price. Why is it any different than setting a price on a new pump?"

"Several reasons, Ed. Mostly due to the cost of handling orders for parts that have comparatively small value. Then there's the question of inventory and storage."

"Just why is that difficult, Al?"

"Well, take this special bolt. We make them up in small lots and know the cost, so it seems easy to set a price. But unless we add the cost of handling an order for one of them, both in the office and in the shop, we'll lose money. And the cost must include getting it from the stockroom, wrapping it for shipment and all handling until it leaves."

"But even that isn't so hard, is it?"

"Not on new or current work, Ed. But when we get an order for a part that has been changed since the original pump went out, we can easily get into trouble."

"Don't we keep extra parts for just that purpose, Al?"

"Yes, Ed. But we never know how many will be needed. We can't very well tie up money in a lot that may not be used in five years, or over. If, or when, we run short we've got to set up and make more. And these cost more money than the original parts."

"But it's darn bad policy not to keep parts for repairs, Al. Gives us sort of a black eye among customers."

"I know that, but it's a worse policy to sell parts for less than they

cost. That not only gives us a black eye—it knocks both of them out. There's another point too, Ed. It's the cost of handling every year at inventory and the cost of storage."

"Storage can't cost much. They just lay there until they're wanted."

"Sure, Ed. But they take up space that we could use to better advantage and we have to include them in our insurance cost."

"Well, what's your bright idea about it?"

"I'm thinking of making a sliding scale of prices for all parts that cannot be taken out of current production. I'll add ten per cent a year on the original price to cover the costs I've mentioned. A part that costs ten dollars now will be eleven dollars the next year after it goes out of production. The year after it will cost twelve dollars and so on. We get a dollar a year extra for keeping it in stock."

"Bet customers will kick at that, Al. But it's your game—not mine."

Is Al's plan for charging for old spare parts sound? Or should he charge the same regardless of age?

Discussion

Play—With Pay

Key men are entitled to a vacation, just as much as anyone else. The fact that he is indispensable is no reason why a workman should not enjoy a hard earned vacation. There can be no doubt that he needs relaxation and change from routine.

Suppose a key man should suddenly be taken sick? Suppose he found another job?—Would the shop cease to run?

It should be to the company's advantage to train men who could "pinch hit" for key men. If the condition outlined by Ed prevails in his plant, then means should be taken to correct it.

Ed's reasoning is a bit fallacious and he is taking a wrong attitude. Certainly the men in the shop are entitled to a vacation, just as much as the men in the office. Both office and plant work can be scheduled to function properly in vacation time.

—Roger C. Dickey,
The International Paper Box Machine Company.

Open House

A concern that manufactures products that are sold directly to the public, such as household appliances, might find it quite an advantage to establish visiting days in its plant. Besides being good advertising and creating good will in the community, this action would tend to promote safer working conditions in the shop. The worker would take more interest in keeping his place of work neat and orderly, if he knew that visitors might drop in at any time, this should more pride in his personal appearance which would no doubt in time enhance the quality of his work.

—Robert Knotek,
Tool Room Foreman,
Fisher Body, Cleveland Division.

The Conscientious Workman

As simple as it may seem, there are only three types of workmen in any vocation:

There is the can't-do-a-job-right, don't-give-a-damn type. A two-foot rule, a two-pound hammer and a cud of tobacco are about the only tools that they need or should have placed in their care.

In this class are often found those the boss calls his best workers. Can they sock holes in metal? They go right through the job, the drill-press table, the floor and down into the cellar, if the drill is long enough. If the gears fly off the top of the press and through the roof, it isn't their fault; they gave it all they could, but the machine would not take it.

Then there is the "Henderson" or conscientious type. They look, they squint and they squat, mostly squat. They indicate, they file, they scrape, they polish, they crocus, they give you the jitters if you watch them. Give this type a pair of steam flanges to face and you will get a nice smooth job, a perfect job; for a blow. A 0.005-in. cut is a rough cut to them.

If you meekly correct them about their way of doing a job you will get their stock remark: "Well you want the job right, don't you?" They should carry a can of talcum powder as part of their equipment.

At last we come to the mechanic who can lap gages, indicate a set up, scrape a fit, file where needed, take a spiral cut on a flange, pick up a sledge and bust a snag off a casting and walk away from each job knowing that it was done right.

This latter type is indeed a rare animal and they are practically all in captivity. The hunting season is just about closed for them.

Assuming that Henderson cannot be enticed from his groove and Ed cannot find one of the rare species at large; Henderson is still his best bet, even though Ed must grit his teeth. —W. E. Fischer.

Run-of-Mine Mechanics

The problem of the "below average" workman is being keenly felt in England. All the first-rate men have long since been absorbed in industry and the few men still floating around certainly need nurse maids, but the problem of successfully absorbing them is not unsurmountable.

Starting in the automatic department, skilled men who are below par gradually recover their lost craftsmanship. In gradual stages they graduate from the automatics to the screw machine and the turret lathe, until a few may reach the standard of average ability.

While being a full-time job for the foreman, grading mechanics will help solve his labor problem—an item of vital importance these days.

—R. G. Hewitt,
Huddersfield, Yorkshire, England.

Many workers who appear not too industrious or adept are more confused by the problems of human relationship in the shop than they are by immediate mechanical problems. At the same time it will be found that the better mechanics are those who have always been free from any inhibitions, and, being more daring have secured necessary experience.

It must be remembered that the good mechanic and the poor one both entered mechanical pursuits with enthusiasm. It is management's fault when this enthusiasm is not maintained and converted into productive labor. Shopping around for the best mechanics in town is a costly procedure. Confidence should be instilled in the below-average mechanics even at the cost of adding the services of a psychiatrist. —Ira S. Williams.

The Open Door

This is a problem every executive must meet. I have found that it pays to let employees get grievances off their chest before they grow to dangerous proportions. Furthermore, it is healthy for the business for employees to realize that the boss is a person who is glad to discuss their problems with them and can see things in a fair light. Whether or not interviews of this sort consume a prohibitive amount of time depends a great deal upon the manner in which they are handled, as well as the conditions that originate them. It is possible for employees to overdo a thing of this sort, once they find that they can get almost anything they want by running to the boss and making a kick about it. Not only fairness but firmness must be used.

If the matter is not of a confidential nature, I believe it preferable to settle the problem out on the job, if possible during one of the tours through the shop that every executive should make. On the other hand, if the problem is of a confidential nature the employee should feel free to ask the executive for a certain amount of time at some mutually agreeable hour. —O. W. Winter.

How Interchangeable?

With machinery that is built to last it is an unwise sales policy to make a great point of interchangeability or customers will think replacements are continually necessary. For firms which have a continual demand for replacements, interchangeable parts may be advisable. For smaller firms whose product cannot be standardized, interchangeable parts offer no advantage because of the increased cost where there is small demand for replacements. —W. E. Warner,
Sompting, Sussex, England.

Shouting Foremen

While, in general, I would not want a shouting foreman, I hope the time will never come when all foremen must conform to a standard pattern. We need spice and variety in the personality of foremen as well as in other things.

Shortly after I finished school I had the privilege of working under a real shouting foreman, one who expressed his feelings vigorously and loudly, but was not the unpopular fellow that might be imagined. He was just as free in expressing favorable comments as in finding fault, we all had confidence that he knew his business and that his decisions were likely to be right. In the third place, we felt that he was a friend in spite of his criticisms.

It would be well to give a little less attention to how the foreman accomplishes his work and a little more as to whether or not he does accomplish it. There are as many different ways of producing results as there are kinds of personality.

—A. W. Forbes,
Forbes & Myers.

VOLUME 81 • AMERICAN MACHINIST, ESTABLISHED 1877 • K. H. CONDIT, F. H. COLVIN, EDITORS • NUMBER 13

Editorials

White Collar Unions

ALTHOUGH Mr. Lewis calls his organizers the Committee for Industrial Organization, his field of intended action is by no means limited to industry. Already plans are completed for drives on the insurance and bank clerks, and a start has been made with insurance salesmen. The Newspaper Guild has flopped from American Federation of Labor to C.I.O. affilation.

Employers will do well to study their relations with their office people just as intensively as they study their relations with their shop force. All of the emphasis has been on the shop relationship because the organization started there, but the office workers will be just as susceptible to the kind of "persuasion" the C.I.O. units know so well how to apply.

It is high time, anyway, that the salaries and working conditions of office employees got attention. Because they had more or less security of employment with paid vacations, and in some instances decent pension arrangements, the employer has been prone to believe that nothing else mattered. Yet many an employer has exploited them mercilessly, demanding unpaid for overtime work running into many hours when an emergency arose, and occasionally when it didn't. The white collar worker is not in the habit of resisting such treatment nor of complaining about it very vociferously. But he has plenty of subconscious or submerged grievances that are sure to come to the surface if the circumstances are right.

NO EMPLOYER looks with any great enjoyment on an industrial system where the shop worker's allegiance is first to his union, and second to his employer. But how much less happy would be a situation where his private secretary or his confidential clerks owed the same primary allegiance to an outside group opposed to the employer on general principles!

The employer owes it to his office staff, to his stockholders and to himself to find a way to protect his white collar workers from coercion, and to adjust their working conditions so that they will not be eager for unionization as the sole way in which they can get what is only their due. He will have to move fast if he wants to be in time.

A Life of Accomplishment

ON the opposite page we publish an all too brief account of the life and accomplishments of Ambrose Swasey. It would take a book to do the job adequately.

At our request Herbert Hoover, a great engineer and a great citizen, has wired us a statement in which he applies those two terms to Mr. Swasey. He was both, and a keen business man besides, as the success of his company proves.

But beyond all these attributes Ambrose Swasey was wise above the attainment of most of us. He knew when to quit. Both he and his famous partner refused to be drawn into the endless struggle for enlargement of plant and activity, that struggle which has broken so many strong men. They set a limit to their plant, and when they had reached a fair measure of success they turned routine matters over to able associates and took time to live.

Mr. Swasey traveled widely, and built up a circle of friends all over the world. He took a keen interest in education, and found time to contribute of his knowledge and experience through membership on the board of trustees of Dennison University, and also the board of the Case school of applied science. He was religious, and gave generously to the church, both in money and in active participation in local and national church affairs.

It is given to few of us to enjoy the success and the span of years that was Ambrose Swasey's. It is given to even fewer to grow old so gracefully and to enjoy life so fully. May his life be an example to more of us.

CHIPS

WASHINGTON

Joint tax committee is formed to investigate tax evasions . . . Roosevelt's opponents call it an effort to distract attention from the devastating report of the Senate Judiciary Committee condemning the court-packing scheme . . . Morgenthau lists ways of evading high income taxes that will probably give some citizens valuable suggestions . . . Secretary Perkins appoints steel mediation board consisting of Assistant Secretary McGrady, Dean Garrison of Wisconsin and Charles P. Taft of Cincinnati, Chairman . . . Farm legislation off for this session . . . Talk increases about complete revision of the tax laws . . . Democrats of congress meet the President in relays on Chesapeake Bay island to try to restore shattered party harmony, many find it impossible to attend because of "previous engagements" . . . Roosevelt wins Senate test on motions to make local governments share in relief . . . Navy will build two battleships in its own yards, bids of private yards too high . . . Sec. Perkins reports record number of jobs filled in private industry during May.

FOREIGN

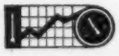
Spanish Insurgents capture Bilbao . . . France struggles with financial problems, and Blum cabinet falls . . . Soviets execute a squad of generals, return army to political control . . . Send three aviators across the North Pole from Moscow to Vancouver, Washington . . . Catholic Schools in Bavaria ordered closed by Nazis . . . French atmosphere clears as Chautemps forms new Popular Front cabinet with Blum's active aid. Hitler and Mussolini lose patience with slow progress of events in Spain and withdraw their warships from neutrality cordon . . . Valencia fears bombardment . . . Italians reported to have sent more troops to Spain . . . British and French fleets move to strategic positions to be ready for trouble.

FINANCE

Stockholders approve Baldwin Locomotive reorganization plan . . . Income taxes exceed revised estimate of first half volume.

INDUSTRY

Many shipyards closed by strikes. . . . Flood of outlaw strikes hampers automobile production seriously . . . Rioting marks struggle between Bethlehem and S.W.O.C. at Johnstown . . . Gov. Earle of Pennsylvania orders martial law to force Bethlehem to close Cambria plant which strikers had been unable to do . . . Sunday truce halts rioting at Youngstown . . . Gov. Davey orders troops to maintain status quo in Ohio . . . I.W.W. wins over C.I.O. in election at Cleveland stove factory (Does this make C.I.O. a conservative union?) . . . Philadelphia Federal Court rules sit-down strike illegal . . . Lewis starts out to organize 800,000 Federal employees, picketing and strikes barred . . . Green holds Lewis responsible for labor riots . . . Angry Johnstown citizens demand Senate investigation of closing of Cambria plant . . . Members of Congress censure state and government officials for failure to uphold laws . . . Outlaw strike forces three Pittsburgh newspapers to suspend . . . General Motors U.A.W. conferences lag, but union officials finally put the heat on local leaders and strifle "quickie" strike enthusiasm . . . Girdler tells Senate Committee that he will sign no agreement with C.I.O. until the Supreme Court rules that he must.



INDICATORS

Steel production holds at about 75 . . . Business Week's index unchanged . . . Electric power output declines moderately.

Ambrose Swasey, in the presence of Herbert Hoover, receiving Hoover Gold Medal from Gano Dunn

Ambrose Swasey Dies

Ambrose Swasey, founder and chairman, the Warner & Swasey Co., Cleveland, manufacturers of telescopes and turret lathes since 1880, died June 15, at his summer home in Exeter, N. H. He was 90 years old.

During the course of his lifetime he had been given all the major honors within the power of his fellow engineers to bestow. All of these were the result of his many years of work in the manufacture of precision instruments and high-grade machines. His passion for mechanical accuracy and precision was shown in the production of a long line of telescopes culminating in the 82-inch reflector telescope for the McDonald Observatory recently completed.

Began as Apprentice

Mr. Swasey began his career as an apprentice in the Exeter Machine Works in December, 1846, at the age of 18. A great friendship, born of common interest, sprang up between Mr. Swasey and Worcester R. Warner. Both of them went to Pratt & Whitney Co. at Hartford, Conn. in 1869. At that plant Mr. Swasey developed an epicycloidal milling machine which turned out gear teeth more accurate than any of that time.

In 1880 Mr. Swasey and Mr. Warner opened a small shop in Chicago where their superior craftsmanship and inventiveness brought instant response in the form of business. A preponderance of orders from cities in the East, plus the difficulties of getting skilled mechanics in Chicago, led to the transfer of their business to Cleveland in 1881.

A nine-in. telescope of exceptional quality, designed by Mr. Swasey, was the first of a succession of great telescopes. In 1888 he built a 36-in. refracting telescope for the Lick Observatory. This was not only the largest refracting telescope built up to that time, but embodied radical changes in its mechanical design. It functioned so perfectly that it established the Warner & Swasey reputation and an order for a 26-in. equatorial telescope for the United States Naval Observatory, Washington, followed in 1892. Orders for other telescopes followed in rapid succession.

One outgrowth of this astronomical work was the famous "dividing engine" perfected by Mr. Swasey in answer to the United States government's desire for a meridian circle for the Naval Observatory at Washington. The greatest error of this engine was less than one second of an arc. His mastery of mechanical design in this engine and in transits and meridian circles, telescopes and production tools, led the company into the production of gunsights, range finders, azimuth instruments, field telescopes and binoculars.

In 1906 the plant was enlarged to three times its former size after which no further expansion was permitted by either of the partners.

Mr. Swasey was instrumental in establishing the Engineering Foundation in 1914. Since that time he has contributed a total of $750,000 for its maintenance. This foundation, administered by the country's four leading professional engineering societies, American Society of Mechanical Engineers, American Society of Civil Engineers, American Institute of Electrical Engineers and the Institute of Mining and Metallurgical Engineers, was created "for the furtherance of research, science and engineering, or for the advancement in any other manner of the profession of engineering and good of mankind."

Aided Schools

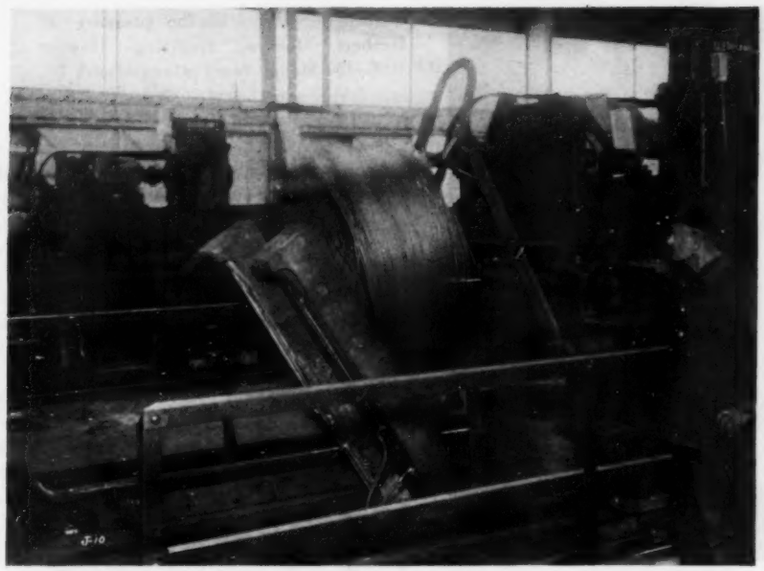
Mr. Swasey played a prominent part in the development of the Case School of Applied Science and served as a trustee. Together with Mr. Warner, he was the donor of its observatory and the founder of an endowment for its chair in physics. He also was the donor of an observatory at Dennison University, Granville, Ohio, where he also provided a chapel.

In 1921 he was made an officer of the French Legion of Honor in recognition of his achievements in the design and construction of scientific instruments. Later he was awarded the John Fritz Gold Medal, the Franklin Gold Medal of the Franklin Institute, and the V.D.I. medal of the Society of German Engineers. In 1933 he was the recipient of the A.S.M.E. Medal.

K H CONDIT, EDITOR AMERICAN MACHINIST =

I WISH TO JOIN WITH OTHERS IN EXPRESSING THE APPRECIATION AND AFFECTION WHICH ALL MEMBERS OF THE ENGINEERING PROFESSION HAD FOR AMBROSE SWASEY HE WAS NOT ONLY A GREAT ENGINEER BUT ALSO A GREAT CITIZEN

=HERBERT HOOVER



Transfer machine lifts bundle of rod from drag conveyor, carries it to hook conveyor in new American Steel & Wire mill

American Steel & Wire Opens Two New Continuous Rod Mills

Temperature drop in rolling operations practically eliminated as rods travel at speeds up to 40 miles per hour

American Steel & Wire Company dedicated two new continuous rod mills at Joliet, Ill., on June 23. C. F. Blackmer, president, and C. F. Hood, executive vice-president, were hosts to a group of leading business men and railroad officials on a tour of inspection through the new mills. Heading the delegation from New York was Ralph H. Watson, vice-president, United States Steel Corporation.

These mills were designed by the company's own engineers and embody all modern improvements and a number of new developments never before used in rod mills. They are part of a $5,000,000 development program which includes improvements in the South Chicago and Gary billet mills, as well as the wire mills in Illinois. It is expected that the two Joliet mills will have a combined capacity of 220,000 tons per year.

In the new mill a No. 5 rod, nearly a mile long, comes off the final pass at a speed of almost 40 miles an hour, which is more than twice as fast as in the old mills.

Features of the mill include furnaces so designed that at any time either natural gas, oil or coke may be used for fuel. The two 19-stand continuous mills are the first completely anti-friction bearing equipped rod mills ever built. In order to keep the mills in line, they are equipped with universal spindles throughout instead of the usual wabblers. A complete central oiling system has been provided for the mills which provides sight flows for all oil lubricated bearings and sprays to the gears.

Gray Iron Founders' Society Elects Peter E. Rentschler

Peter E. Rentschler, president, Hamilton Foundry & Machine Co., Hamilton, Ohio, was elected president of the Gray Iron Founders' Society at the ninth annual convention held in Cleveland, June 11-12. Other officers elected were: R. E. Kucher, vice-president, Olympic Foundry Co., Seattle, Wash., vice-president; J. H. Pohlman, vice-president, Pohlman Foundry Co., Inc., Buffalo, secretary; W. L. Seelbach, secretary-treasurer, Forest City Foundries Co., Cleveland, treasurer.

W. H. Harrison Elected President of A.I.E.E.

At the annual meeting of the American Institute of Electrical Engineers held in Milwaukee, Wis., June 21–25, W. H. Harrison, Assistant vice-president, American Telephone & Telegraph Co., succeeded A. M. MacCutcheon as president. The annual report of the Board of Directors, presented at the meeting, showed a total membership on April 30 of 15,308. In addition to two national conventions and two district meetings, 1,984 meetings were held during the year by the local organizations of the Institute in the principal cities and educational institutions in the United States, Canada, and Mexico.

In addition to the newly elected officers the following hold-over officers will constitute the Board of Directors for the next administrative year: A. M. MacCutcheon, Cleveland; O. B. Blackwell, New York; L. T. Blaisdell, Dallas; F. M. Farmer, New York; N. E. Funk, Philadelphia; H. B. Gear, Chicago; C. Francis Harding, Lafayette, Ind.; F. Ellis Johnson, Columbia, Mo.; C. R. Jones, New York; W. B. Kouwenhoven, Baltimore, Md.; K. B. McEachron, Pittsfield, Mass.; C. A. Powel, East Pittsburgh, Pa.; C. E. Rogers, Seattle, Wash.; R. W. Sorensen, Pasadena, Calif.; A. C. Stevens, Schenectady, N. Y.; J. B. Whitehead, Baltimore, Md.

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WATCHING Washington

Democratic insurgents shun Jefferson Island party pow-wow . . . Wage-hour bill may be modified . . . Logrolling tariff is in the making . . . Tax dodge probe proves dud

WASHINGTON—Not all the Congressional Democrats attended the party's love feast on Jefferson Island over last week end. Some had previous engagements, others were indisposed and still others just "couldn't swim." Strangely enough nine out of ten party members who sent regrets belong to the rebel group that has balked on recent New Deal legislation.

On the eve of the outing Senator Robinson, Democratic leader, announced that debate on the President's court bill would begin this week. Apparently the severe jolt which this proposal got from the uncompromising language of the Senate Judiciary Committee was not sufficient to offset the Presidential persistency behind it. Indeed several Congressmen were suspicious enough to infer that the primary purpose of the Chesapeake Bay gathering was to corral them back into the fold. As one of them put it, "No amount of drinking, eating or fishing would change my mind on the court plan or any other plan."

Limit to Legislation

Indeed results of the week-end pow-wow may tell whether this Congress will produce some more laws or go home leaving the Black-Connery bill, the court reformation, TVA, tax dodging, housing, government reorganization and other major issues to simmer through the summer. If the legislators can stare the White House down they may offer it a choice between action within limits or none. They might go along on the child labor bill alone, or on basic hours and wages with the child labor provision; but chances seem against any potent form of Labor Standards Board at this time.

Senator Bridges, N. H., has just introduced a substitute bill providing a 40-hour basic week and 40 cents per hour basic pay, with variables written into the law, which employers would apply at their own discretion. No administrative board is provided. North-South differential would be left to Congress. Senator Black's office says the committee will consider the Bridges bill.

Out of the volume of testimony and sideline opinion on the labor standards bill, four main issues emerge; they are (1) Section 5, which gives the proposed Labor Standards Board unprecedented powers to supplement collective bargaining; (2) lack of regional wage differentials (particularly as between North and South); (3) lack of any specific protection against the flood of low cost imports that might follow enactment; and (4) exemption of small employers.

Logrolling Looms

While it may not get anywhere this year, an old-fashioned logrolling high tariff drive is virtually assured. All the ingredients are on the fire.

Manifest in many letters is alarm over the possibility of increased imports of innumerable commodities which may result from increased costs in America. So far the move is not organized—most Senators and Representatives know only about their own commodities. However, it is only a question of time before the logrolling process begins—you support my tariff on shoes and I will support yours on woolen cloth.

The Administration will not favor this. It will play havoc with the Hull reciprocal trade treaties; but unless present pressure by individual manufacturers disappears, it would seem certain that some compromise must be submitted by the White House and State Department if a real revolt is to be avoided. It bids fair to become a real test of the Administration's ability to handle a tough situation.

Fireworks Fizzle

So far President Roosevelt's tax dodging bombshell has proved a dud. Maybe it has a delayed fuse; maybe it will go off with a loud bang at the revelation of some spectacular names and devices so far not even hinted. But at the moment the "incorporated pocketbook" publicity which Secretary Morgenthau said was more important than legislation has not awakened any popular resentment; that is, not since the first statement which tended to help the general Roosevelt strategy of convincing the country that he is for the underdogs and against the rich.

Surtaxes Stand

A surprise move almost upset the Senate's passage of the $650,000,000 House bill to extend for two years the so-called nuisance taxes and the three-cent postage. Senator LaFollette's amendment which would drastically boost surtaxes on incomes above $6,000 was passed and then rescinded a half hour later. Another amendment to lower exemptions was defeated without a record vote. Finally the measure was passed without amendment.

Another bill introduced by Senator Walsh of Massachusetts would permit the Federal Trade Commission to approve cooperative price agreements among manufacturers. Government price fixing is not authorized or intended; agreements could be approved only when the Commission ruled them economically sound and free from price fixing or selling in excess of reasonable prices based on cost. The bill would also increase the Commission from five to nine members.

A measure that has attracted little attention on Capitol Hill as yet would establish a Federal Unemployment Commission to be composed of the Attorney General, Secretaries of Commerce and Labor, the chairman of the Federal Trade Commission and the Social Securities Board. This commission would be directed to take a census of unemployment showing all jobless above 18 and under 65 years of age "who are mentally and physically employable." Provision is also made for setting up local boards throughout the county, one in each county if practical and one for each 30,000 population in the cities. Section 3 would provide that the commission shall establish working weeks the length of which would depend on the number of unemployed revealed in the census.

Machine Tool Dealers at Skytop

At one of the best attended meetings in recent years the Associated Machine Tool Dealers voted to issue a new membership list containing the lines represented by the members, and to include with it a reproduction of the Code of Ethics adopted a dozen years ago. Pleading pressure of other duties, H. R. Rinehart, executive secretary, was relieved, and Thos. A. Fernley, Jr., of the same organization was elected in his place.

Mornings of the two-day session at Skytop Lodge, Canadensis, Penn., June 14 and 15, were devoted to routine matters and the afternoons were spent on the golf links. More formal addresses featured the evening program. The members approved the suggestion of holding regional meetings and the officers were asked to attend as many as possible.

At the first morning meeting, Mason Britton, vice-chairman, McGraw-Hill Publishing Co., Inc., spoke informally on the Washington situation, and then urged the members to concentrate on improving their selling methods and control, and on educating their salesmen to make the most efficient use of the relatively short time they have with each customer. He pointed out that the average man gains the great majority of his impressions through his eyes, and recommended particular attention be given to improving the sales kit or portfolio, and to changing it frequently.

L. D. Rigdon and J. R. Weaver, both of Westinghouse Electric & Manufacturing Co., spoke at the dinner, as did Tell Berna, general manager, National Machine Tool Builders' Association. Mr. Berna pointed out that the relationship between machine tool builders and dealers is an odd one. "According to the latest figures available," he said, "the largest machine tool builders, those selling over $2,000,000 yearly, sell 98 per cent of their domestic output through dealers. Those selling less than $500,000 yearly, sell 56 per cent through dealers. Two-thirds of the machine tool builders sell either wholly or partly through dealers.

"That means that the machine tool builder selling direct finds himself in competition with other manufacturers selling through dealers and he is correspondingly interested in the standard of business conduct that the dealers have set up.

"The problems that we must work out together are important to all of us. The standardization of territory outlines is not complete; the question of cash discounts; the problem of the used machine tool; and the problem of how far we are to go in giving technical service and engineering advice, come readily to mind; surely none of them so formidable that they cannot be successfully solved with patience and understanding.

"The decision as to whether a given product should be sold in a certain territory by dealer or through the manufacturer's own sales force often is dictated by circumstances; the nature of the product, the nature of the market, and the financial strength of the manufacturer. One of the outstanding services you have rendered to our industry is to afford a young concern, which is of necessity working with limited capital, a ready-made and effective sales force in all parts of the country, without putting this concern to the delay and expense of finding and training its own salesmen.

"But there are a host of cases which lie in a controversial field, and in these cases the best argument you can present to support selling through dealers is the excellence of your selling force. Just as the manufacturer is constantly developing a better machine and is never content to assume that the perfect machine has been built; so we who sell must be constantly on the lookout for improved methods. There is such a thing as selling technique; it is not a science and no formula can be used; but it is an art. It is not high pressure selling; quite the contrary. We must live with our customers; our men must call on them over and over again."

Industrial Review

• EXCEPT in one or two sections of the country, machinery sales continue their down trend. Industrial buying is naturally distributed to industrial uncertainty. In addition, the high volume of machinery shipments during the past year have filled the most urgent needs of many plants so it is not strange that a slackening of sales should be felt in a season that in normal years has seen the low point in activity. However, inquiries from concerns not previously active in placing orders indicate that the basic demand for manufacturing equipment is still a long way from being satisfied.

• NEW ENGLAND reports a slow month of June with expected orders unexpectedly withheld. On the other hand inquiries continue in good volume which makes the outlook for future sales optimistic. The New York territory is a bright spot, with sales for June maintaining the May level and activity continuing strong. While off from the year's peak, machinery sales in Philadelphia hold a satisfactory volume but inquiries are scarcer. Confidence is expressed for the Fall months despite the tendency to hold up buying because of labor uncertainty.

• PITTSBURGH has felt a decided recession in both orders and inquiries. A few Cincinnati manufacturers enjoyed better machine tool sales in June but here, too, the trend points slightly downward. Some delay has been experienced because of the slow delivery of materials. There are indications, however, that some large orders may break in July. Business in Cleveland is getting pretty thin.

• DETROIT VOLUME has been maintained due to buying on the part of three or four companies. Inquiries are not coming in as freely as they were and the prospects are that a number of plants will close during July for a changeover period. Supply business is quiet and will likely remain so until September. Some slowing down is felt in Chicago, but there has been an increase in inquiries. If two or three large deals materialize volume will be substantially increased. The fact that orders are being received from steel companies still in the throes of labor difficulties is an encouraging indication. Small tool business has held up very well. May and the first half of June were good in Milwaukee, but the last two weeks witnessed a falling off. Both inquiries and orders have kept at a good level in Indianapolis. Inquiries from the Indianapolis engine plant of International Harvester are demanding a lot of attention. In St. Louis, however, orders are decidedly off and inquiry is slower. The Pacific Coast has also experienced something of a slump in machine tool buying.

Detroit LETTER

Labor troubles do not halt plant expansions . . . Chrysler, General Motors and Ford all buying . . . Hupmobile to bring out big six . . . Lower profits for auto industry in 1938 . . . U. A. W. enters slate of candidates for Detroit offices

DETROIT, June 28—General Motors has notified the United Automobile Workers that it will not negotiate changes in the union agreement until it has assurances that the latter can fulfill its contract obligations. This action was taken after 240 unauthorized strikes had occurred in the first 103 working days after the corporation signed an agreement on February 11. As a result of this demand, President Homer Martin has turned on the heat, and strikes have abruptly halted. General Motors intends to demand written pledges against slowdowns as well as against sitdowns and walkouts, and may try to get the U.A.W. to agree in writing to the discharge of any union member responsible for or participating in any strike or slowdown violating the terms of the agreement.

DETROIT—Though the motor industry is rightly bemoaning a bad labor situation, it is proceeding with plans for a big year in '38. Fisher Body is spending $15,000,000 for expansion at Flint, Grand Rapids, Cleveland and Trenton, N. J. The Ternstedt Division of Fisher Body will make hardware and metal interior trim parts for closed car bodies in a new factory at Trenton which will supply eastern assembly plants of General Motors. New equipment to be installed there will include small machine tools, punch presses, die casting machines, plating and graining equipment and enamel baking ovens. This is Ternstedt's first venture outside of Detroit.

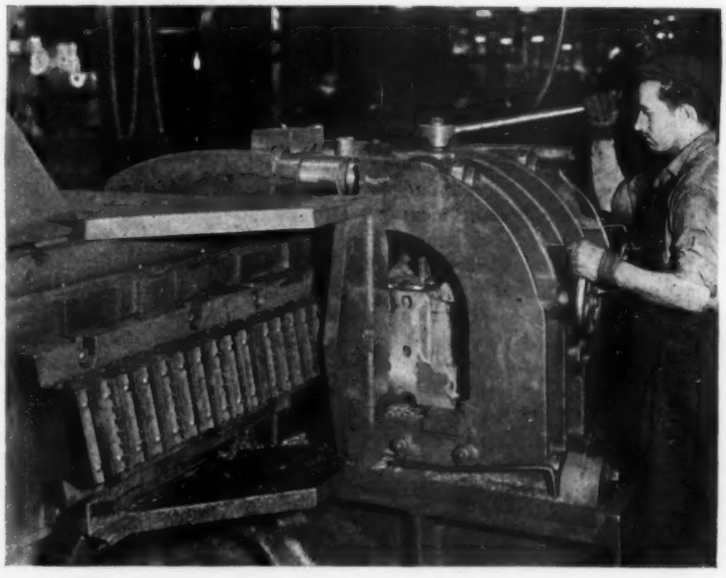
Chrysler Expansion

Chrysler is pouring around $14,000,000 into new projects and new equipment for next year. The new engine plant for Chrysler of Canada and the transmission plant at Kokomo, Ind., head the list but pushing them for top honors will be a program just getting under way. Chrysler has started to build a new plant at Eight Mile and Mound Roads in Detroit to which operations of the Dodge Truck Division will eventually be transferred. This plant will be considerably larger than the present truck factory in Lynch Road and will be able to take care of the rapidly growing business of the truck division. After the truck division is moved to its new home the Lynch Road plant, which adjoins the Plymouth plant, will be used to expand Plymouth's parts manufacturing operations. This means that Plymouth in the months ahead should have a major tooling program for the Lynch Road building which should involve equipment for machining engine parts. Plymouth has been overcrowded for several years but has managed to get along by building engines and other parts ahead during the off season.

Ford too is expanding. It lately has been buying machinery for its new Milford, Mich., "village industries" factory where carburetors will be made. Ford is taking no chances on outside tie-ups because of labor trouble and now is increasing its steelmaking operations by enlarging some of its open-hearth furnaces. It is about to erect a third blast furnace and new by-product coke ovens at Rouge and has ordered steel mill annealing furnaces and other equipment. Since Jan. 1 Ford has bought over $5,000,000 of new machinery and intends to spend large sums the remainder of the year. Delayed deliveries of machine tools are not keeping Ford from going ahead with its buying program. Also it is not deterred by the constant threat that the C.I.O. will put it on a hot spot. Its policy is "business as usual."

Hupmobile will present late in August a 122-inch wheelbase six with a 100-hp. motor and a 125-inch wheelbase straight eight with 120-hp. engine. A Warner Gear transmission will be used, with the overdrive optional at extra cost. All machining work on the motors, which are almost the same in design as those in previous models, will be done at the Hupp factory.

Car prices next year will go up 7 to 10 per cent because of higher labor rates and higher materials and parts prices. The hourly wage of the



***A Block a Minute*—Hydraulic broaches finish the manifold side of De Soto cylinder blocks; vertical blades traveling at 26 ft. per min. give a smoother surface, prevent possible compression leakage**

automobile worker has increased about 20 cents the past year which is equivalent to $35 a car. Higher production costs also have resulted from the epidemic of quickie strikes, from slowdowns (which are more prevalent than the public hears about) and from the general letdown in efficiency among workers since the C.I.O. began stirring up so much turmoil. While prices will be raised, the advance will not cover all the added cost. The industry suspects that if it should tack on the true extra-cost figure, the administration might be inclined to make political reprisals, because Washington is interested in keeping car prices down to a minimum. Car makers probably will have to take some of the costs out of earnings, thus foreshadowing lower profits in 1938.

The labor situation continues hot. The United Automobile Workers have had so many victories in their sweep through the industry that now they have concluded to try to take over Detroit's city government. They have entered a full slate of candidates, with the cooperation of the Detroit Federation of Labor, an A.F. of L. affiliate. Richard Frankensteen and Walter Reuther, two leading organizer and the presidents of the Chrysler and Dodge locals are candidates for council. Chief motive is believed to be desire to gain control of the Detroit police department, although a platform with 17 planks has been formed. Observers think that the U.A.W. is letting itself in for a severe licking, despite its large membership. Its candidates for the Board of Education in Flint this spring were beaten three to one.

One Year—325,000 members

The U.A.W. today claims 350,000 members, the highest total on record. A year ago, when Homer Martin took office, there were less than 25,000 dues-paying members. The union admits that some of its present members have joined because they thought it best to do so, though at heart they are not unionists. It flatly denies, however, that workers have been coerced or intimidated into joining. On the other hand, a clause outlawing the use of coercion or intimidation by unions has been stricken out of Governor Frank Murphy's industrial relations bill now before the Michigan Senate at the specific request of the U.A.W.

What the U.A.W. is aiming at is clearly seen by the situation at Nash Motors. It is practically impossible for a non-union man to work in the Nash plant today.

Chrysler Promotions

J. E. FIELDS

D. A. WALLACE

D. A. Wallace Appointed Head of Chrysler Division

J. E. Fields, vice-president and director of the Chrysler Corp., has resigned as president of the Chrysler Division to assume more important duties in the executive management of the corporation as a whole. His headquarters will be at the general offices, Highland Park, Mich. Mr. Fields is to strengthen the central management group which is under increasing pressure of responsibility due to the growth of business, according to K. T. Keller, president, Chrysler Corp. Mr. Fields has been associated with Chrysler since 1922.

David A. Wallace, vice-president in charge of manufacturing, Jefferson and Kercheval plants, Chrysler Division, and president, Chrysler Marine Engine Division, is to succeed Mr. Fields as president, Chrysler Division.

Management Congress to be Held in Washington, D. C.

The Seventh International Management Congress, bringing to the United States authorities on industrial and commercial management from about 40 countries, will be held in Washington, D. C., Sept. 19-23, 1938, it was announced at a dinner in New York last week. William H. Batt, president, S.K.F. Industries, Philadelphia, presided over the dinner meeting, at which William B. Warner, president, National Association of Manufacturers, was the principal speaker.

This Congress will discuss the latest developments in management, based on more than 200 papers selected competitively from experts all over the world. Six sections, running simultaneously, will deal with management problems in production, administration, distribution, personnel or labor relations, and others. Mr. Batt as chairman of the coordinating committee for the Congress has the following organizations cooperating with him: American Management Association, American Society of Mechanical Engineers, The Association of Consulting Management Engineers, International City Managers' Association, Personnel Research Federation, Life Office Management Association and the Society for the Advancement of Management.

Ralph E. Flanders, president, Jones & Lamson Machine Co., is chairman of the production section for this Congress.

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Monarch Machine Tool Co., Sidney, Ohio, has added a new bay to its plant. This addition of 18,000 sq.ft. makes a total of 100,000 sq.ft. now available for the production. HUGH W. ROBINSON has been placed in charge of a new office at 3115 N. Meridian St., Indianapolis. STANLEY BRANDENBURG is now the New Englandrepresentative with offices in Hartford, Conn.

M. B. LANE, formerly connected with Goodrich Tire & Rubber Co., and the Norton Co., is now with the Bay State Abrasive Products Co., Westboro, Mass., as manufacturing supervisor of rubber bonded grinding wheels.

W. G. TUNIS has been made general manager of the transmission plant, Chrysler-Dodge Division, Kokomo, Ind. He has been with the company since 1915. RAY M. HIRST will be master mechanic of the plant.

James H. McGraw, Jr., Elected President of McGraw-Hill Publishing Company

Effective June 21, James H. McGraw, Jr. was elected president of the McGraw-Hill Publishing Co. to succeed Malcolm Muir, resigned. Mr. McGraw, Jr. continues as chairman of the board and assumes the additional responsibilities of the office of president.

Following his graduation from Princeton University in 1915, Mr. McGraw entered the service of the company and for twenty-one years has served actively in various posts connected with its publishing activities. After eight years of service with individual papers and groups of papers, he entered the general management of the company as treasurer in 1923, and became executive vice president in 1932. In 1935 he was elected chairman of the board to succeed James H. McGraw, founder of the company.

In 1932 and 1933, Mr. McGraw served as president of the Associated Business Papers and in addition to his work in his own company he has contributed generously of his time and effort to the advancement of business paper publishing. Thoroughly grounded in the editorial tradition, he has applied himself aggressively to keeping the business paper abreast of what is best in modern publishing practice from the viewpoint of both readers and advertisers.

Blank & Stoller

JAMES H. McGRAW, JR.

Philip Murray Will Address Industrial Relations Group

Philip Murray, chairman, Steel Workers Organizing Committee will open a full day's discussion on collective bargaining at the twentieth annual Silver Bay Industrial Relations Conference, which will be held August 25-28 at Silver Bay-on-Lake George, N. Y. Frank Rising, labor editor, *Business Week*, will also speak. It is expected that the evening session of this day will be addressed by a prominent manufacturer who will endeavor to synthesize varying viewpoints on this "hot spot" issue.

Dr. J. Douglas Brown, Princeton University, will open the conference with a background and perspective review of "Industrial Relations Under Today's Conditions." Glenn Gardiner, Forstmann Woolen Co., Passaic, N. J., will lead a symposium on the subject "Industry and Its Relations to the Community." Edward Francis McGrady, Assistant Secretary of Labor, will speak on "Government and Industrial Relations." George E. Sokolsky will address the final main session on "Industry's Responsibility in Maintaining a Democracy."

In addition to the scheduled papers, sectional conferences will be held as follows: "What of Incentives?", under Merritt B. Lum, Johns-Manville Corp.; "Wage and Hour Legislation," L. C. Morrow, editor, *Factory Management and Maintenance;* "Foremen's Round Table," Meade W. Patterson, superintendent, Bridgeport Brass Co.

Austin B. Wilson Heads Electro-Platers' Group

Held in New York City, June 14, 15, 16, and 17, under the auspices of the New York branch, the twenty-fifth annual convention of the American Electro-Platers' Society registered a total of 557 delegates. An exhibit displayed plated finishes and parts produced by individual electro-platers and a number of manufacturers.

Papers reporting on research in electrodeposition at the National Bureau of Standards were delivered by Dr. William Blum of the Bureau, and P. W. C. Strausser, A.E.S. research fellow now working at the Bureau. A magnetic method for measuring the thickness of nickel coatings on non-ferrous metals was described by A. Brenner, U. S. Bureau of Standards. Dr. Blum and C. E. Vincent Davies described the use of color photography in the inspection of exposure tests of plating. It was pointed out that exposure tests show only the relative value of different coatings; such tests give no indication of the ultimate life that can be expected from a given protective coat.

Individual papers were presented by: W. S. Pinner and L. B. Sperry, Detroit; Walter R. Meyer, electrochemist, General Electric Company; Dr. Gustave Klinkenstein, vice-president and technical director, Maas & Waldstein Co.; Albert Hirsch, electroplater and chemist, McFall Co.; F. C. Mesle, electrochemist, Oneida, Ltd.; W. S. Barrows, Toronto, Canada; Leo Roon, technical director, Roxalin Flexible Lacquer Co., Donald Wood, Reed & Barton Co.; Edward C. DeLorme, Boston; George B. Hogaboom, Hanson-Van Winkle-Munning Co.; Lionel Cinamon, Special Chemicals Corp.

The Philadelphia, Cleveland, Newark, Waterbury, Bridgeport and Rochester branch members cooperated in preparing papers dealing with everyday plating problems. Barrel electroplating, effect of free cyanide on cathode efficiency of silver plating solutions, health hazards, gold electroplating, barrel rolling of metal parts, practice in brass plating, and cyanide copper plating practice were discussed in these papers. Practically every paper pointed out the need for careful attention to all factors in order to obtain desired results in plated surfaces.

Milwaukee was chosen as the 1938 convention city. The 1939 convention, during which it is planned to hold an International Conference, will be held at Asbury Park, N. J., under the auspices of the Newark branch.

New A.E.S. Officers

PRESIDENT
Austin B. Wilson
Chevrolet Motor Co.

FIRST VICE-PRESIDENT
Franklyn J. MacStoker
Medallic Art Co.

SECOND VICE-PRESIDENT
Ray R. Goodsell

THIRD VICE-PRESIDENT
Austin Fletcher
Brewer Titchener Corp.

EXECUTIVE SECRETARY
W. J. R. Kennedy

PERSONALS

JOSEPH L. TRECKER, treasurer, Kearney & Trecker Corp., Milwaukee, is now vice-president. He fills the vacancy caused by the resignation of PHILIP P. EDWARDS, who resigned to become an executive of the Ingersoll Milling Machine Co., Rockford, Ill. THEODORE TRECKER has been re-elected president.

WILLIAM L. PETERS, formerly vice-president and general manager, Toledo Stamping & Mfg. Co., has formed Metal Stampings, Inc., Toledo, to develop a new die and stamping business.

JAMES B. SHEA, formerly works manager, Youngstown Pressed Steel Co., has been appointed general superintendent, Reeves Mfg. Co., sheet-metal products, Dover, Ohio. He succeeds C. SCHAMP who has been named head of the company's purchasing department.

STUART G. BAITS is now president of Hudson Motors of Canada. He has been associated with Hudson Motor Car Co., Detroit, for the past 22 years having been first vice-president of the company prior to his recent appointment.

B. C. HEACOCK, president, Caterpillar Tractor Co., Peoria, and WILLIAM C. DICKERMAN, president, American Locomotive Co., New York, were elected directors at large of the Chamber of Commerce of the United States.

ALFRED C. GULLIVER has been made manager of the new Chevrolet Plant at Buffalo, N.Y. The plant will be ready for the production of engines, gears and axles by next January and will employ 3,000.

DONALD C. BAKEWELL, formerly vice-president and chairman of the executive committee, Continental Roll & Steel Foundry Co., is now a special representative of the Blaw-Knox Company, Pittsburgh.

JOHN B. CAMPBELL has been elected vice-president, Pettibone-Mulliken Co., railway materials, castings and forgings, Chicago. He has been general manager of the company since 1932. H. R. PREST is now secretary and treasurer. H. J. BRAZELTON will assist him.

FREDERICK T. MOORE, vice-president, has been made first vice-president of Colt's Patent Fire Arms Mfg. Co., Hartford, Conn. DWIGHT G. PHELPS, manager of the electrical division, has been elected vice-president in charge of that division. BENJAMIN F. CONNOR, manager of the plastic division, is now vice-president of that division. H. D. FAIRWEATHER, treasurer, is vice-president and treasurer.

J. F. LINCOLN, president, The Lincoln Electric Co., Cleveland, is in England giving a series of talks at the invitation of various engineering societies and institutes. Groups before whom Mr. Lincoln is scheduled to speak include the South Wales and Monmouthshire Institute of Engineers, the Institute of Engineers and Shipbuilders of Scotand, the Institute of Mechanical Engineers in London.

E. L. LUDVIGSEN, formerly vice-president in charge of sales, is now vice-president and general manager of the Fuller Mfg. Company.

S. F. DUPREE, JR., president, All-Metal Universal Joint Co., Cleveland, is to take charge of the Bendix Automotive Division in southern California.

WM. B. MAYO, for the past 19 years engineer and chief engineer for Ford Motor Company, has been named consulting engineer for Hupp Motor Car Corp., Detroit. He will be associated with FRANK E. WATTS, vice-president in charge of engineering.

HARRY M. MANSFIELD has been elected president of the Barber Gas Burner Co., gas burners and regulators, Cleveland, succeeding the late HARRY E. KERR.

GOSTA LOFBERG, formerly president of S.K.F. Steels, Inc., is now president of Uddeholm Co., of America, Inc., New York.

M. F. JUDKINS has been appointed chief engineer, Firthite division, Firth-Sterling Steel Co., McKeesport, Pa.

HARVEY T. HARRISON is now sales manager, Duraloy Co., Scottdale, Pa.

Exports of Machinery During April, 1937

	April, 1937	March, 1937	April, 1936
Electrical machinery and apparatus	$11,009,517	$9,325,955	$7,882,068
Power generating machinery (except automotive and electric)	1,427,898	1,000,028	672,139
Construction and conveying machinery	2,030,026	1,365,899	870,409
Mining, well and pumping machinery	5,938,467	4,510,810	3,113,017
Power-driven, metal-working machinery	5,119,671	4,497,750	4,600,454
Other metal-working machinery	368,435	479,913	449,552
Textile machinery	756,116	710,537	884,785

Exports of Metal-Working Machinery During April, 1937

	April, 1937	March, 1937	April' 1936
Engine lathes	$294,734	$209,729	$40,713
Turret lathes	209,899	332,128	95,303
Other lathes	69,537	160,026	71,075
Vertical boring mills and chucking machines	209,898	277,838	108,681
Thread cutting and automatic screw machines	365,281	208,768	147,397
Knee and column type milling machines	385,675	256,697	116,232
Other milling machines	397,406	347,361	115,836
Gear cutting machines	302,463	255,206	163,651
Vertical drilling machines	47,691	74,117	35,161
Radial drilling machines	16,824	31,624	11,376
Other drilling machines	183,673	129,253	167,756
Planers and shapers	27,101	56,667	45,525
Surface grinding machines	216,352	145,511	78,578
External cylindrical grinding machines	116,143	113,211	111,336
Internal grinding machines	224,992	191,587	101,625
Tool grinding, cutter grinding and universal grinding machines	198,768	152,439	89,107
Other metal grinding machines	194,907	68,074	76,031
Sheet and plate metal working machines	459,370	255,567	1,150,112
Forging machinery	128,788	326,612	232,665
Rolling mill machinery	399,390	204,952	881,987
Foundry and molding equipment	90,257	78,794	83,868
Other power-driven metal-working machinery and parts	580,522	621,589	310,039
Other Metal-Working Machinery			
Pneumatic portable tools	130,128	121,856	91,523
Portable and hand and foot operated metal working machines and parts	102,904	98,994	71,237
Chucks for machine tools	25,807	26,329	17,753
Milling cutters, machine operated threading dies and taps and similar machine-operated metal cutting tools	60,929	178,012	196,297
Other metal-working machine tools	48,667	54,722	72,742

M.I.T. Plans Conference on Fatigue and Creep of Metals

A conference on fatigue and creep of metals will be held at the Massachusetts Institute of Technology, Cambridge, Mass., July 15–16. This will close a summer conference of four weeks on the strength of materials being held at the Institute.

Among those scheduled to speak are A. Nadai, R. E. Peterson, and C. R. Soderberg, Westinghouse Electric & Mfg. Co.; H. J. Gough, National Physical Laboratories, Pettington, England; R. L. Templin, Aluminum Co. of America; E. L. Robinson, General Electric Co.; J. J. Kanter, Crane Co.; T. McLean Jasper, A. O. Smith Corp.; H. S. Moore, University of Illinois; R. W. Clyne, American Steel Foundries and K. Arnstein, Goodyear-Zeppelin Corp.

Graton & Knight President

FREDERICK E. BARTH

F. E. Barth Has Been Made President, Graton & Knight

Frederick E. Barth, vice-president, Graton & Knight Co., belt manufacturer, Worcester, Mass., has been elected president. He succeeds the late Frank H. Willard.

Mr. Barth entered the industrial field as a staff member of L. L. Harr Corp., New York, production and accounting engineers. He went to Worcester in 1917 to perfect production methods for Graton & Knight. In 1919 he was made office manager, sales manager in 1924 and vice-president in 1926.

BUSINESS ITEMS

Elsbert Mfg. Co., Inc., Chicago, has been formed to produce automotive accessories. President of the company is B. J. GRIGSBY, organizer and head of the former Grigsby-Grunow Company. R. J. GRIGSBY is vice-president, O. E. GRIGSBY is secretary, and H. E. KRANZ, chief engineer.

Carboloy Co., Inc., Detroit, announced that F. C. RITNER is now assistant to the president, in charge of special wear-resistant applications, new developments and special products. T. B. MACLAFFERTY, formerly of the General Electric Co., has been appointed assistant to the general sales manager. H. C. STONE, formerly of the Newark office, will represent the company in Brooklyn and New York City.

Hanson-Whitney Machine Co., taps, gages and other precision equipment, announce that BERRY THOMAS, General Motors Building, Detroit, is their new factory representative.

The Eagle Belt Lacer Co., Stratford, Conn., is moving to a larger plant just completed at 1261 Stratford Ave.

Lyon Metal Products, Inc., Aurora, Ill., has appointed H. B. SPACKMAN as general sales manager.

Gary Screw & Bolt Co., Chicago, announced that ROBERT W. DIERKER is now sales manager.

Denver Metal & Machinery Co., Denver, has recently acquired Morse Bros. Machinery & Supply Co., and has changed its name to Morse Bros. Machinery Co., with main offices at 2900 Broadway. Officers of the firm are MAX GRIMES, president, and J. D. MCSHANE, vice-president.

Briggs Mfg. Co., and Motor Product Co., Detroit, directors have radified the merger of the two companies.

Bendix Aviation Corporation has leased two buildings at the Burbank Airport, Los Angeles, according to VINCENT BENDIX. The company plans to enlarge its aircraft and automotive operations in California.

Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J., has prepared the Roxalin Trail Blazer, which is touring the country demonstrating industrial finishes. The trailer which is 22 ft. long houses more than 200 parts and assembled products actually in commercial production, which have been finished with lacquer and synthetic coatings on various basic materials and involving various finishing problems.

Designers for Industry, Inc., Cleveland, industrial designers and product stylists, have established New York quarters in International Building, Rockefeller Center. The office will be in charge of H. C. GOODING.

OBITUARIES

Robert R. Keith, J. I. Case General Works Manager, Dies

Robert R. Keith, general works manager, J. I. Case Co., Racine, Wis., died June 12. He was 58 years old.

Prior to joining the Case Co. in 1929 he was in charge of motor truck, coach and all automotive transportation engineering of the International Harvester Co., with which he became affiliated in 1921. In earlier years Mr. Keith held management positions with Moline Plow Co., Holt Co., and Fairbanks Morse Co.

Was J. I. Case Manager

ROBERT R. KEITH

Mr. Keith graduated from Iowa State College in 1902. He has been active in the Society of Automotive Engineering for many years having served on various national committees. At the time of his death he was chairman of the Society's Production Activity Committee.

HAROLD B. DINNEEN, vice-president, Minneapolis-Moline Power Implement Co., Minneapolis, died June 9 at the age of 53. Mr. Dinneen had been in the implement business since 1904.

CHARLES A. STRELINGER 81, president, Charles A. Strelinger Co., machine tool dealer, Detroit, died June 16. He founded the company in 1884.

ALFRED H. SAWYER, president, Judson L. Thomson Mfg. Co., rivets and rivet setting machines, Waltham, Mass., and formerly sales representative of the B. F. Sturtevant Co., Hyde Park, Mass., died June 14. He was 70 years of age.

WILLIAM A. KINNEAR, 72, retired secretary, Warren Axe & Tool Co., Warren, Pa., died recently.

DR. JOSE BAXERES DE ALZUGARAY, metallurgical chemist who pioneered in the development of vanadium steel, died June 12 at the age of 71. Dr. Alzugaray was identified with the early armoring of war vessels and with the improvement of the electric furnace and its products.

JOHN H. NICHOLSON, former vice-president, National Tube Co., died June 20 at the age of 70. Mr. Nicholson was a pioneer in the development of seamless tubing.

Czechoslovakia Offers Market for Machinery

Czechoslovakia offers an active market for all kinds of industrial machinery, according to the Machinery Division, Department of Commerce. Some 2,000 metal-working plants, 1,600 textile mills, 3,500 woodworking establishments, 500 chemical works and about the same number of leather factories, which represent four-fifths of the industries of the former Austria-Hungarian empire, are located within the present borders of the country. With the return of improved business conditions there is an active demand for new machinery to replace obsolete machinery. Germany leads in sales to this country due to its proximity and its low prices which are aided by government subsidy as high as 25 per cent of the export value. American machinery has established a reputation in this market for superior quality which partially offsets these advantages. The United States ranks second to Germany in export to Czechoslovakia, the 1936 value doubled that of 1935.

Agent Sought by Czech Firm

Perner Bros., manufacturers of machinery for slicing beef and of machinery for sharpening, cutting, slicing and defusing processes, and machinery and knives for sugar and alcohol refineries, Tynec n/K., Czechoslovakia, want a representative in this country. Address American-Czechoslovak Chamber of Commerce, Inc., Room 1306, 1440 Broadway, New York.

EXPORT OPPORTUNITIES

* Interested American firms and individuals may obtain the names and addresses of the foreign firms making these inquiries upon application to the Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce, Washington, or any district or cooperative office. Please refer to key number.

Brick making, marble sanding, and surfacing, envelope-making, spring-and-nail making, meat-cutting and sausage-making machinery, and circular and band saw. (Agency.) Jerusalem, Palestine. *3382.

Diesel engines, marine and stationary portables. (Agency.) Bogota, Columbia. *3400.

Horseshoe, manufacturing machinery and equipment. (Purchase.) Bombay, India. *3398.

Diesel engines, marine and stationary; milk pasteurizers, and centrifugal pumps. (Purchase and Agency.) Vladivia, Chile. *3402.

Industrial Machinery. (Agency.) Zurich, Switzerland. *3389.

Lubricating systems, acid pumps, flour-and-grain mill machinery, and roller and ball bearings. (Agency.) London, England. *3391.

Printing equipment. (Purchase.) Batavia, Java. *3399.

Pumps, turbine, deep-well. (Agency.) Habana, Cuba. *3401.

Welding, aluminothermic, equipment and fluxes. (Purchase.) Brussels, Belgium. *3419.

MEETINGS

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS. Pacific Coast Convention. Spokane, Wash., August 31-September 3. H. H. HENLINE, secretary, 33 West 39th St., New York.

INDUSTRIAL RELATIONS CONFERENCE. Twentieth Annual Meeting. Silver Bay-on-Lake George, N. Y., August 25-28. J. M. GROVES, executive secretary, 347 Madison Ave., New York.

NATIONAL COACH TRAILER MANUFACTURERS' ASSOCIATION. Exhibit and meeting. Manistee, Mich., August 1-10. E. JUNGCLAS, secretary, 1719 Brackman Ave., Mount Washington, Cincinnati.

PATENTS

June 8, 1937

Metal-Working Machinery

Machine for Producing and Re-Sharpening Cutter Blades. John Hansen, Bettendorf, Iowa. Patent 2,082,832.

Metal-Working Machine (Multiple Spindle). George F. Yager, Oliver J. Heath, and Harold E. Wagner, Toledo, Ohio, assigned to The Bunting Brass & Bronze Co., Toledo. Patent 2,082,929.

Degreasing Apparatus. Robert A. Eastwood, Weston, near Runcorn, England, assigned to Imperial Chemical Industries, Ltd. Patent 2,083,012.

Machine Tool (Multiple Drill with Conveyor Table). Albert M. Johnson and Walter M. Fairbairn, Rockford, Ill., assigned to Barnes Drill Co., Rockford. Patent 2,083,023.

Apparatus for Welding. Earnest W. Mishler, Youngstown, Ohio, assigned to The Youngstown Sheet & Tube Co., Youngstown. Patent 2,083,034.

Cutting Press. Julius Standt, Pirmasens, Germany. Patent 2,083,097.

Grinding Machine. Clement Booth, Cincinnati. Assigned to Cincinnati Grinders Inc. Patent 2,083,115.

Honing Machine. Albert M. Johnson, Rockford, Ill., assigned to Barnes Drill Co., Rockford. Patent 2,083,194.

Parts and Mechanisms

Method and Apparatus for Welding, (Automatic Feed.) Robert R. Applegate, Shaker Heights, Ohio. Patent 2,083,309.

Metal-working Machine (Automatic Loader). Robert S. Brown, New Britain, and William B. Retz, Plainville, Conn. Assigned to the New Britain Machine Co., New Britain, Conn. Patent 2,083,312.

Honing Tool. John R. Rose, University City, John C. Cox and Frank H. Maas, St. Louis, Mo., assigned to Wagner Electric Corp., St. Louis. Patent 2,083,400.

Rail Chuck for Machine Tools. Theodore A. Wettig, Cincinnati, Ohio. Patent 2,083,414.

Screw Thread Cutter Attachment. Hubert Riester, Collingswood, N. J. Patent 2,083,473.

Tools and Accessories

Surfacing Apparatus. Herbert R. Stratford, Cleveland, Ohio, assigned to The Stratmore Co., Wilmington, Del. Patent 2,082,916.

Measuring Tool (Combination Inside and Outside Calipers). James M. Hardesty, East Orange, and Clement C. Lawson, Morristown, N. J., assigned to Bell Telephone Laboratories, Inc., New York. Patent 2,083,373.

Burring Tool. Albert Brunner, St. Louis, assigned to Wagner Electric Corp., St. Louis. Patent 2,083,427.

Laying-Out Device. Vitus A. Boker, Minneapolis, Minn. Patent 2,083,490.

June 15, 1937

Metal-Working Machinery

Grinding or Polishing Device. Lloyd Burkhalter, Columbus, Ohio, assigned to Ray Edgar Falkinburg and Maynard Lee Davis of Columbus. Patent 2,083,685.

Metal Expanding Machine. James J. Carroll, Detroit. Patent 2,083,775.

Hand-Fed Machine Tool (Miller). William H. Nichols, Waltham, Mass. Patent 2,083,858.

Carburizing Furnace. Fredolf J. Peterson, deceased of Detroit, and Sadie F. Peterson, Detroit. Patent 2,084,002.

Tapping Machine. Edward D. Frank Cincinnati, assigned to The National Automatic Tool Co., Richmond, Ind. Patent 2,084,022.

Keyway Forming Machine. Henry E. Morton, Muskegon Heights, Mich. Patent 2,084,061.

Metalworking Press. Frederich J. Rode, Chicago, and Adam Ziska, Wauwatosa, Wis., assigned to Rudolph W. Glasner, Chicago, and to Clearing Machine Corp., Chicago. Patent 2,084,066.

Lapping Machine. Herbert S. Indge, Westboro, Mass., assigned to Norton Co., Worcester, Mass. Patent 2,084,279.

Processes

Method of and Apparatus for Shaping Metal (Metal Tubes). Marshall H. Ward, Brooklyn, N. Y., assigned to Bridgeport Thermostat Co., Inc., Bridgeport, Conn. Patent 2,083,763.

Method of Lining Metallic Vessels. Stanley M. Secrist, New York, N. Y., assigned to American Sheet & Tin Plate Co., New Jersey. Patent 2,084,298.

Parts and Mechanisms

Carriage Mounting for Grinding Machines. Harold E. Balsiger and Conrad L. Ott, Waynesboro, Pa., assigned to Landis Tool Co., Waynesboro. Patent 2,083,682.

Machine Tool Carriage Control. Amos P. Steiner, Waynesboro, Pa., assigned to Landis Tool Co., Waynesboro. Patent 2,083,748.

Abrading or Polishing Implement. Earl E. Price, Minneapolis, Minn., assigned to G. H. Tennant Co., Minneapolis. Patent 2,083,793.

Tool Support. George E. Mirfield, Youngstown, Ohio, assigned to The Youngstown Sheet & Tube Co., Youngstown. Patent 2,084,040.

Tools and Accessories

Centering Arbor. Harry S. Beckett, Pitman, N. J., assigned to S K F Industries, Inc., Philadelphia. Patent 2,084,124.

Pilot for Valve Grinding Tools. Herman W. Zimmerman, Chicago, assigned to Automotive Maintenance Machinery Co., Chicago. Patent 2,084,175.

What Size Plug Gage?

CORRECT solutions to W. H. Smila's puzzle (*AM*—Vol. 81, page 435) have been submitted by the following contributors:

Elmer E. Aughenhaugh, Nils R. Axelsson, Alfred Chabourel, Jackson Hazlewood, C. F. Hetherington, Fred M. Hill, William W. Johnson, Nils H. Lou, Heinz A. Mueller, Harry J. Patterson, Mabel I. Purdum, E. S. Sampson, G. E. Searle, Harry Silk, C. L. Stanton, Cloice E. Temple, Rolf Thienemann, Roy Van Zante, Emil Wittman, Louis A. Szabo, William W. Neal, Murrell Kautz, Virgil Schrolucke.

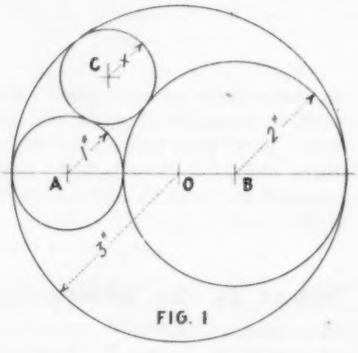


FIG. 1

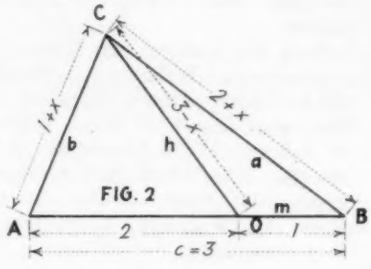


FIG. 2

Fig. 1 depicts the conditions of Mr. Smila's problem, wherein it is necessary to find the size of plug gage C that will fit in a 6-in. ring along with 4-in. and 2-in. plug gages, all plug gages being tangent to the ring and to each other. From Fig. 2 the radius x of plug gage C can be found by the following method:

In triangle ABC

$$\cos B = \frac{a^2 + c^2 - b^2}{2\,a\,c} \qquad (1)$$

In triangle OBC

$$\cos B = \frac{a^2 + m^2 - h^2}{2\,a\,m} \qquad (2)$$

Equate (1) and (2)

$$m\,(a^2 + c^2 - b^2) = c(a^2 + m^2 - h^2)$$

$$m\,(a^2 + (c+b)\,(c-b)] = c\,[a^2 + (m+h)\,(m-h)]$$

Put $a = 2 + x$, $b = 1 + x$, $c = 3$, $h = 3 - x$ and $m = 1$.

Then:

$$1\,[(2+x)^2 + (4+x)\,(2-x)] = 3\,[(2+x)^2 + (4-x)\,(x-2)]$$

$$12 + 2x = 3\,(10x - 4)$$

$$28x = 24$$

$$x = \frac{24}{28} = \frac{6}{7} = 0.85714$$

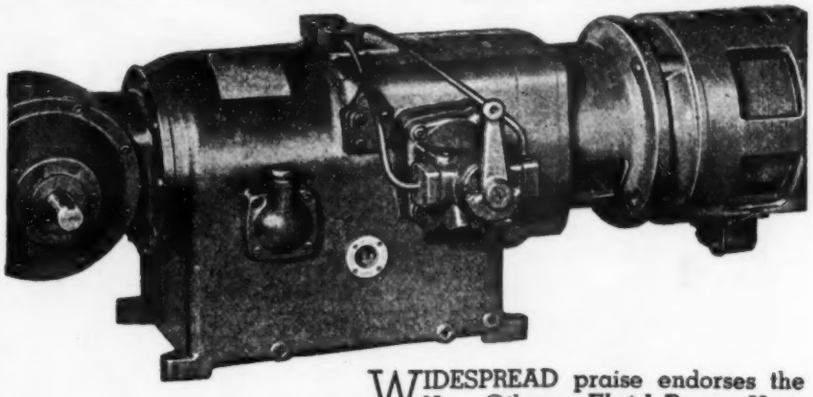
The diameter of the plug gage equals $2x$ or 1.7143 in.

Fitting Gaskets

JOHN E. HYLER
R. G. Le Tourneau, Inc.

WHATEVER the field of service in which gaskets are applied, their function must be kept in mind. Too often we become so used to putting in gaskets that we forget the degree of their importance. No matter whether air, steam, gas or liquids are to be held under pressure, accuracy

"THE FINEST WE HAVE EVER USED"



- ★ Smooth Acceleration and Deceleration
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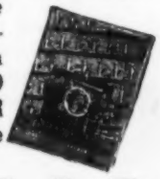
- ★ Smaller Size, Lower Cost

WIDESPREAD praise endorses the New Oilgear *Fluid Power* Variable Speed Transmission. Production men say its performance amazes them. It provides hairline accuracy of speed control; steplessly variable speed; even, positive speeds; smooth acceleration and reverse; a complete range of automatic and hand operation. The new simplified design makes Oilgear compact, widely adaptable and low in price. You will want full information about the transmission that is upsetting production figures in many lines. Bulletin 60000 sent free. THE OILGEAR COMPANY, 1309 W. Bruce St., Milwaukee, Wisc.



OILGEAR

Fluid Power

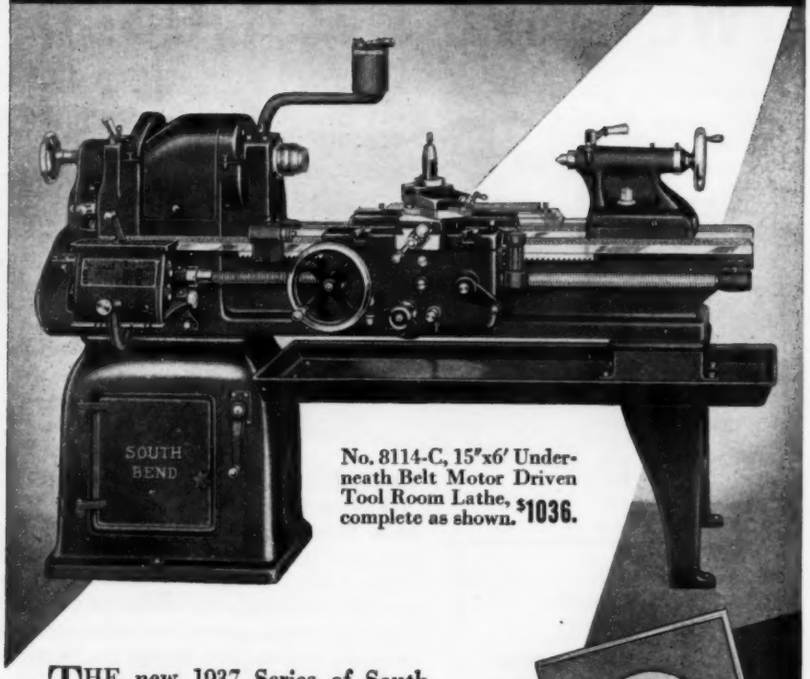
VARIABLE SPEED TRANSMISSIONS

in fitting gaskets is of great importance. When a gasket must be pulled even slightly awry to permit any of the bolts to pass easily through the holes, there is grave danger that its life will be short and there is a chance that it will not hold the required pressure from the very start.

Accuracy in making gaskets is advisable, but in particular we must not be stingy in the matter of the diameter of the bolt holes unless we are positive that the holes have been located with exactness in relation to the holes in the work. In general, when a few gaskets are made at a time it will do no harm to make the bolt holes quite a bit oversize, as the gaskets will then be allowed to take natural seatings without wrinkling.

The contention of many large users of gaskets that it pays to have them made to drawings or templets by those who specialize in such work is doubtless correct in the majority of cases. Gaskets cut by special machines are certainly more accurate than are those cut by hand, and indications are that in future days there will be very few cases where they will be otherwise cut when the quantity is sufficient to warrant tooling.

NEW 1937
SOUTH BEND *Precision* LATHES



No. 8114-C, 15″x6′ Underneath Belt Motor Driven Tool Room Lathe, complete as shown. $1036.

THE new 1937 Series of South Bend Back-Geared, Screw Cutting Precision Lathes with Double Wall Aprons and hardened and ground headstock spindles are recommended for the finest and most accurate work in the tool room, machine shop, manufacturing plant, and laboratory. Offered in sizes from 9″ to 16″ swing, in bed lengths from 3′ to 12′, Underneath Belt Motor Drive, Countershaft Drive, and Pedestal Motor Drive.

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WRITE FOR NEW CATALOG
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MODERN LATHES FOR MODERN INDUSTRY

One Gage for Three Holes?

H. G. SCHROLUCKE
Engineering Department,
The Monarch Machine Tool Company

IF, IN TOOL designing, you were to make solid plug gages to fit the three holes illustrated, it would be natural

to make three separate gages. However, it is possible to make one gage, 1 in. long, that will exactly fit all three holes (although not recommended for general use). Can you design such a gage?

What Is the Dimension?

ADDITIONAL successful contributors of answers to George R. Shore's puzzle (*AM*—Vol. 81, page 351) are as follows:

Paul W. Abbott, Jr., Elmer E. Aughenlaugh, William A. Brandt, R. J. Brown, Alfred Chabourel, J. Homewood, Henry M. Hunt, William W. Johnson, M. R. Lynnworth, I. F. MacRae, J. H. O'Neil, H. C. Osborne, Francis W. Shaw, George Suessle, James M. Wagaman, J. H. Davis, Paul Grodzinski.

•

A jewelry manufacturer's name adorned our "gold" collar buttons before the soft-collar shirt claimed 85 per cent of those still fortunate enough to have a shirt. Now he sells them to India. The natives like the decorative effect, and use collar buttons all the way down the shirt front instead of ordinary buttons.

NEW BOOKS

THE FORD V8 CARS AND TRUCKS. *Construction, Operation and Repair. By Victor W. Page. 700 5x7½ in. pages, 360 special engravings. Red cloth binding. Published by The Norman W. Henley Publishing Co., 2-4 and 6 West 45th St., New York, N. Y. Price, $2.50.*

Ford truck and car fleet operators, garage men, and individual owners

will welcome this book which gives in one place the workings and repair of V8 models up to and including 1937 types. Trouble shooting, power plant overhaul, location of defects in carburetion, ignition and cooling systems are handled in a complete and easily understood manner. Special tools for expediting this work are illustrated. Carburetors and other parts that have been modified in production to give better performance are listed as replacements, so that maximum efficiency can be obtained from the overhauled or tuned-up vehicle. There seems to have been some "mystery" about V8's, but Mr. Page's book clears it away entirely in well-written, easily followed language.

•

THE SOUTH AMERICAN HANDBOOK, 1937—*Fourteenth edition. 600 4½x7-in. pages. Published by Trade and Travel Publications, Ltd., London, and sold in the United States by The H. W. Wilson Co., 950 University Ave., New York, N. Y. Price $1 postpaid.*

This yearbook and guide to the countries, products, trade and resources of Cuba, Mexico, Central and South America is a business man's directory, a traveller's handbook. Each country is dealt with individually, and there are in addition systematic summaries of the air, railway, steamship and banking facilities. Moreover a number of good maps illustrate geographical features and railway facilities of certain countries.

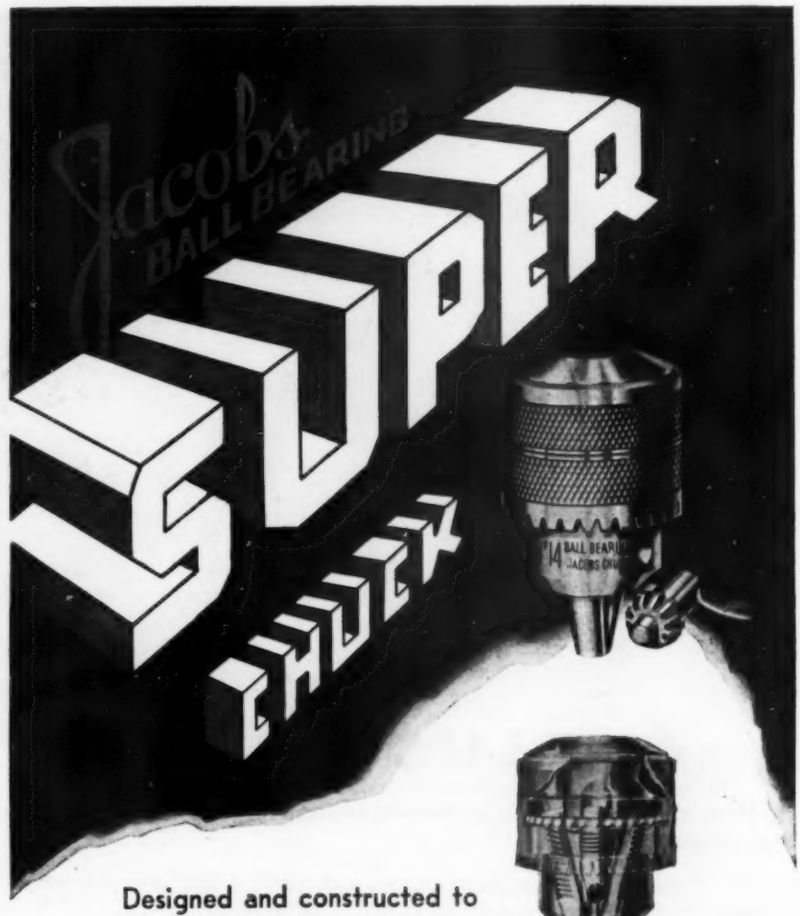
The "local" information given is particularly enlightening and interesting. Of Argentina, the author says, "Rent is a most serious item. A single man can obtain a bed-sitting room in a respectable boarding house at approximately $160 per month, inclusive of light breakfast and evening meal." Fortunately, he apparently means paper Argentine dollars which have a par value of $23.55 to $10 United States currency.

•

MACHINE SHOP OPERATIONS—*Job tickets for machine shop work. Edited by J. W. Barritt, formerly supervisor of apprentices, Westinghouse Electric & Manufacturing Company, Philadelphia. 850, 8½x10¾-in. pages. Red screw-post binder. Published by the American Technical Society, Drexel Ave., at 58th St., Chicago, Ill. Price, $5.*

These job tickets cover 280 actual jobs on the lathe, milling machine, slotter, horizontal boring machine, shaper, drill press, planer, vertical boring mill, and jobs with measuring tools, in bench work, in floor work, and in layout work. The tools needed and a step-by-step discussion of how to do a given job are given with each topic. Pen and ink drawings make the discussion clear. Questions at the end of each job ticket enable the student to review the lesson and determine how well he has mastered the principles involved.

Those having apprensiceship or vocational training programs under their direction will appreciate the manner in which this material is written and assembled. Individual job tickets can be taken out because of the screw-post binding and then used in classroom or shop. Mr. Barritt has had the form and content of these job tickets checked by shop superintendents and master mechanics connected with the machine-tool and automotive industries.



Designed and constructed to match in excellence the finest machine tools built, the Jacobs Ball Bearing Super Chuck delivers the ultimate in accuracy, gripping power, speed of operation and long life.

IF IT'S A Jacobs IT HOLDS

THE JACOBS MANUFACTURING COMPANY
HARTFORD CONNECTICUT, U.S.A.

TRADE PUBLICATIONS

AIR FILTERS. "Norblo" round-type air filters are described in Bulletin No. 500-2 offered by The Northern Blower Co., West 65th St., Cleveland.

BEARINGS. A 15-page bulletin has been published by The Fast Bearing Co., Hampden Ave. and 23rd St., Baltimore, Md., describing the Fast bearing. Design of this bearing is such that centrifugal force produces a pressure film on which the bearing is floated.

BEARINGS. Catalog No. 10, published by Neveroil Bearing Co., 29–99 Foundry St., Wakefield, Mass., lists and describes oilless and self-lubricating bearings and special shapes made from "Woodex" impregnated wood, "Graphex" graphited metal, and "Coprex" special bronze.

BELTS. Alexander Bros. Inc., 14 South St., Philadelphia, offers a 32-page catalog, No. A-117, describing Tentacular belts and listing information of value to belt users.

BUFFS & COMPOSITIONS. The Hanson-Van Winkle-Munning Co., Matawan, N. J., offers Bulletin No. BC-104 on Buffs and Compositions. This bulletin illustrates and describes the various materials and discusses the use for each material.

CABLE ACCESSORIES. Anaconda Publication No. 371 is a 100-page book listing and describing various types of insulated cable accessories. Copies can be obtained from Anaconda Wire & Cable Co., 25 Broadway, New York, N. Y.

CALENDAR. Continuing the practice of mid-year distribution, the General Electric Vapor Lamp Co., Hoboken, N. J., has issued a wall calendar running from June 1937 to June 1938.

CHAIN DRIVES. Dossier A-2, second in a series of booklets describing positive power transmission applications of chain drives, has been published by Baldwin-Duckworth Chain Corp., Springfield, Mass.

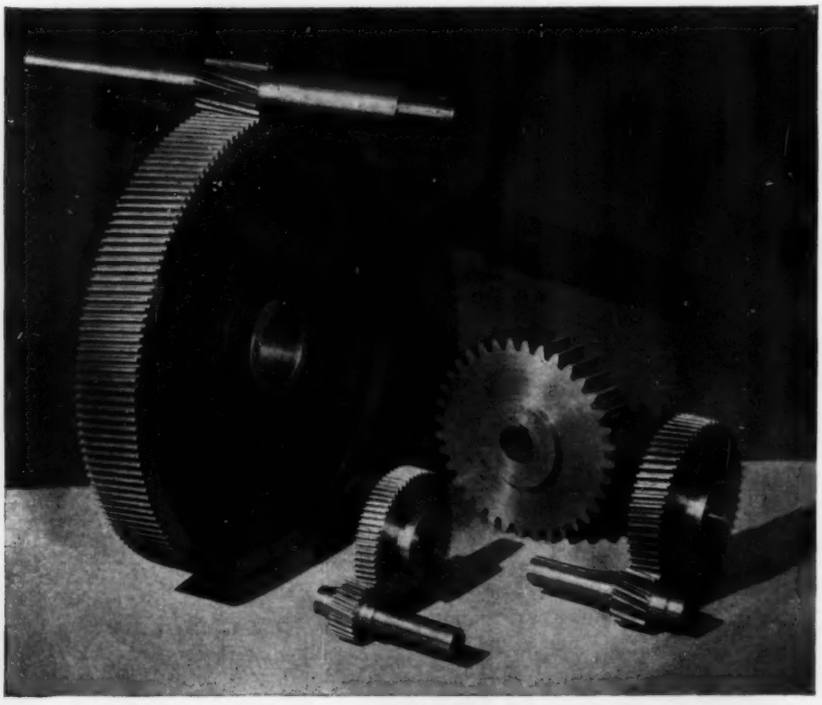
CHEMICAL BURNS. Industrial Safety Series No. Chem. 3 pamphlet published by National Safety Council, 20 North Wacker Drive, Chicago, Ill., is limited to consideration of the nature and treatment of burns from chemicals commonly used in industry. This pamphlet has the title "Chemical Burns, Their Nature and Treatment" and will be of interest to industrial medical departments.

CLUTCHES. Rockford Drilling Machine Div., Borg-Warner Corp., 113 Catherine St., Rockford, Ill., offers a 22-page booklet describing industrial applications of the "Pullmore" clutch.

COATED ABRASIVES. Simplified Practice Recommendation R89–36, "Coated Abrasive Products," effective December 30, 1936, is available from the Superintendent of Documents, Washington, D. C., at a price of 5 cents per copy. This recommendation was prepared by the National Bureau of Standards, U. S. Department of Commerce.

CORROSION. The Duriron Co., Inc., Dayton, Ohio, has published a 12-page catalog listing and describing corrosion-resisting process equipment and materials.

CYLINDRICAL GRINDERS. Landis 6- and 10-in. Type C Plain Hydraulic Cylindrical Grinders are described in Catalog No. D–37. This catalog, published by Landis Tool Co., Waynesboro, Pa., includes a large number of illustrations showing various features of these machines.



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★ Here are a few important features of Horsburgh & Scott Helical gears that benefit every user.

1. The outside diameter, faces, bores and ends of the hubs are smoothly finished to the correct size.
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3. The pitch line is absolutely concentric with the bore.
4. Whether arm or web construction the pattern is chosen not alone for strength but also for pleasing appearance.
5. Rim and arms or web are extra heavy for the pitch.
6. Hub diameters are generously large to allow for reboring and to eliminate the key patch.

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DETACHABLE INSTRUMENTS. Catalog Section 43-600, a 10-page illustrated bulletin, describes the new line of detachable instruments manufactured by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Information in the bulletin includes outline dimensions, application data, a discussion of economic advantages and construction details.

DIESEL TRACTORS. Form 4189, published by Caterpillar Tractor Co., Peoria, Ill., illustrates and describes "Caterpillar" diesel tractors for various purposes. Photographs show tractors at work with different equipment.

DRILL GRINDER. "Black Diamond" precision drill grinders are described in Circular No. 115A, offered by Black Diamond Saw & Machine Works, Inc., Natick, Mass.

ELECTRICAL APPLIANCES. Underwriters' Laboratories, Inc., 207 East Ohio St., Chicago, Ill., has published a revised list of inspected electrical appliances. Dated May, 1937, this list replaces all similar lists and supplements of earlier dates.

FLEXIBLE COUPLINGS: Bulletin No. 4100, published by The Falk Corp., Milwaukee, Wis., describes the line of flexible couplings offered under the trade name "Steelflex Couplings". This bulletin supersedes Bulletins No. 181 and No. 182.

FLEXIBLE COUPLINGS. The second edition of Catalog No. 35, describing flexible couplings made with the fatigue-resisting flexible disk ring, is offered by Thomas Flexible Coupling Co., Warren, Pa. This 64-page catalog lists the various styles and sizes of couplings available and illustrates typical installations.

FLEXIBLE METAL HOSE. A 26-page booklet, describing Rex-Weld and Rex-Tube flexible metal hose, is announced by Chicago Metal Hose Corp., Maywood, Ill. This booklet illustrates and explains latest developments in flexible hose design and construction.

FLOW METERS. A 49-page bulletin on flow meters for steam, liquids and gas has been issued by the Foxboro Co., Foxboro, Mass. Ask for bulletin No. 200-2.

FLOW METERS. The Bristol Co., Waterbury, Conn., is offering a 40-page catalog describing electrical and mechanical flow meters. These instruments are for recording, integrating, controlling and indicating the flow of steam, liquids or gases.

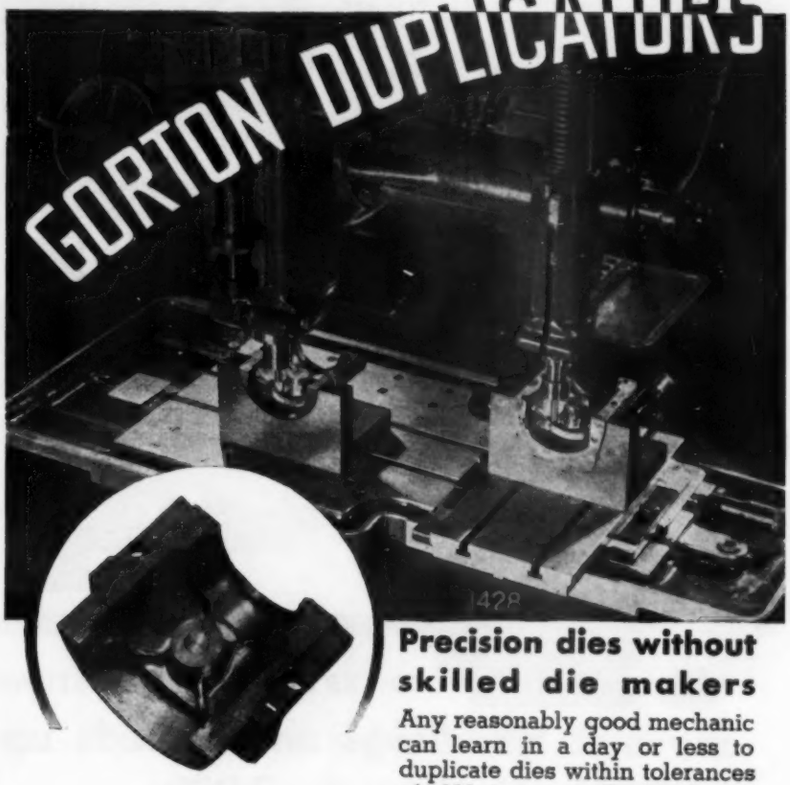
GAGES. A 112-page catalog describing various types and sizes of gaging Sheffield Gage Corp., Dayton, Ohio.

HAND TOOL. Catalog No. 37, published by the Forsberg Mfg. Co., Bridgeport, Conn., is a 48-page booklet listing and describing the various hand tools offered under the "Whale", "Thor" and "Viking" trade marks.

HEAT TREATING FURNACES. The Bellis Heat Treating Co., Branford, Conn., has published a folder describing "Bellislavite" furnaces for hardening, tempering and annealing.

HEAT-RESISTANT CHAINS. Bulletin No. 59, published by Baldwin-Duckworth Chain Corp., Springfield, Mass., lists and describes various standard non-corrosive and heat-resistant chains. Included in this bulletin is a table giving data on the resistance of Type 18-8 stainless steel to various chemicals and acids.

"IDEAL" PRODUCTS. A revised edition of its catalog is now offered by the Ideal Commutator Dresser Co., 1439 Park Ave., Sycamore, Ill. This includes descriptions of a new washer punch, rotary stripper, turn-



Example No. 1428 — Automobile piston core box just as it came from the Duplicator. Reproduced from polished cast iron model in 2½ hours within limits of .001" for all dimensions. Flat faces and circular inside portions were finished before duplicating. Two cuts, roughing with a single flute Gorton cutter and finishing with a special 16 flute ball nose cutter ¼" diam., removed approximately 3/32 of stock. 480 of these core box halves were reproduced from chilled cast iron in this way.

Precision dies without skilled die makers

Any reasonably good mechanic can learn in a day or less to duplicate dies within tolerances of .001 in. on a Gorton Duplicator. The operator works directly from the original die or a built-up master. This method saves time and errors compared with laying out work from complicated drawings.

The extremely high spindle speeds of Gorton Duplicators leave a smooth finish comparable to a ground surface and reduce hand polishing to a minimum. An 8½D Duplicator is here set up for reproducing automobile piston core boxes. This machine is not expensive as duplicators go.

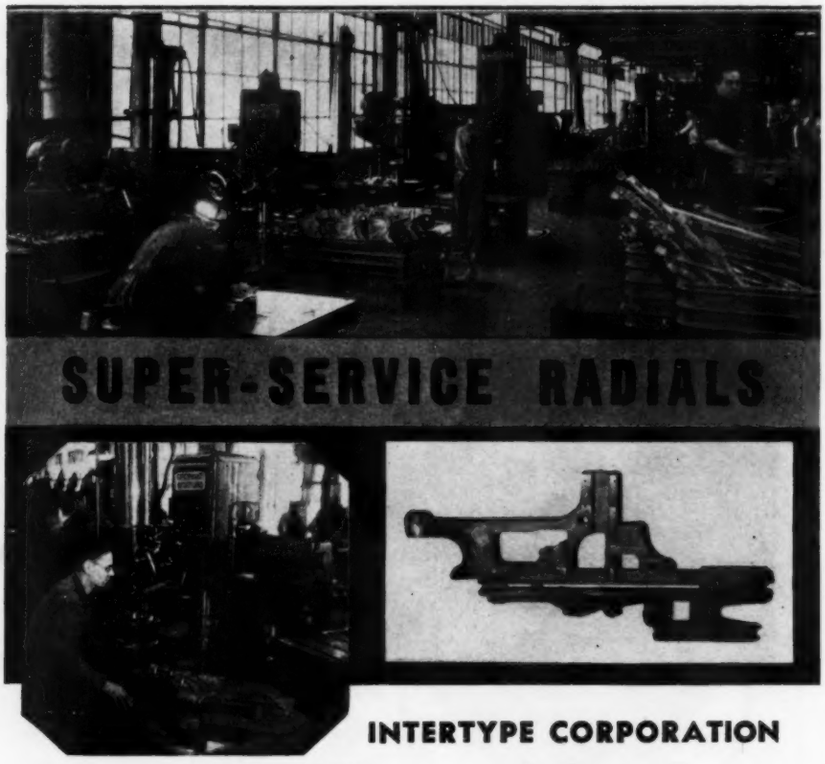
GEORGE GORTON MACHINE CO.
1103 13TH ST., RACINE, WIS.

ing tool head, air-gap gage, wire stripper and the Marshall voltage and speed regulator in addition to items previously listed.

INDUSTRIAL FINISHES. Everseal Mfg. Co., Inc., Broadway and 57th St., New York, offers a six-page booklet describing the new line of F.W.B.—Everseal modern industrial maintenance finishes that are fortified with bakelite resins.

INSERTED BLADE CUTTERS. National Twist Drill & Tool Co., 6522 Brush St., Detroit, Mich., has published a folder listing and describing the recently announced "Adjusto-Lock" inserted blade milling cutters.

INSTRUMENTS. A slide-rule indicator for use in selecting proper instruments for any application has been announced by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Called the "Instrulector", this slide-rule shows the instruments to use, their range, approximate price and size.



INTERTYPE CORPORATION

Saves 2 Handlings and Speeds up Production nearly 20% . . .

• Fifteen months ago the Intertype Corporation modernized drilling, reaming and tapping operations on cast iron face plates for typesetting machines by installing five Super-Service Radials.

Production time per piece has been reduced from 47.7 minutes to 41.7 minutes. Where three handlings were formerly required, all operations are now performed in one handling.

Quoting Mr. C. E. Bittner, Works Manager, "The high spindle speeds permit us to drill small holes faster and straighter. We have been able to discard a single purpose drill press."

If more and better work at lower cost per piece interests you, modernize drilling, tapping and reaming with Super-Service Radials. Write for detailed information.

THE CINCINNATI BICKFORD TOOL CO., OAKLEY, CINCINNATI, OHIO

CINCINNATI BICKFORD

INSTRUMENTS. Bulletin No. DMF 714, published by the Foxboro Co., Foxboro, Mass., illustrates and describes typical electrical distance transmission instrument installations, particularly as applied to flow meters and liquid level gages.

INSULATION. Spaulding Fibre Company, Inc., Tonawanda, N. Y., has published a sheet of engineering information regarding Spaulding Armite, a thin insulation for electrical and mechanical uses.

INSULATION. "Stic-Tite" plastic insulation for industrial purposes is described in a bulletin published by Refractory & Insulation Corp., 381 Fourth Avenue, New York.

KIPP TOOLS. Bulletin No. AT-2500, published by Madison-Kipp Corp., Madison, Wis., illustrates and describes Kipp air tools, Madison-Kipp lubricators, and Madison-Kipp die casting machines.

MACHINE FASTENERS. Russell, Burdsall & Ward Bolt and Nut Co., Port Chester, N. Y., is offering a "Handbook of Common Machine Fasteners." Illustrations of 26 of the latest accepted standard methods of drawing various bolts, nuts and rivets are given.

MATERIAL HANDLING. Hand propelled carriers with motor operated hoists for any loads up to three tons are described in a folder, Form No. G-337, offered by the Cleveland Crane and Engineering Co., Wickliffe, Ohio.

MILLING CUTTERS. Solid shank end mills and other "TEC" products are listed and described in a new 36-page catalog published by The Equipment Co., 11246 East Vernor Highway, Detroit, Mich.

MOTOR CONTROL. A 24-page booklet entitled "The Story of the Solenoid Starter" is announced by The Allen-Bradley Co., 1315 So. First St., Milwaukee, Wis. This booklet points out the reasons for developing the solenoid starter.

OPENSIDE SHAPER. Folder Form No. 7, published by Rockford Machine Tool Co., Kishawaukee and 23rd St., Rockford, Ill., illustrates and describes the double-housing "Hy-Draulic" openside shaper. This machine has a nominal stroke of 36 in.

OPTICAL INSTRUMENTS. "Optical Aids in The Metal-Working Industries" is the title of Catalog No. D-22, offered by Bausch & Lomb Optical Co., Rochester, N. Y. This 16-page booklet lists and describes various microscopes, microscope tubes, optical flats, centering levels, and

optical drill gages suitable for use in metal-working shops.

PLATERS' SUPPLIES. Gloves, boots and aprons for use by electro-platers are illustrated and described in a folder published by the Udylite Co., 1651 East Grand Blvd., Detroit, Mich.

PLATING HEATER. An electric immersion heater for plating tanks, designed for hanging over the side of the tank, is described in leaflet No. TA-104, offered by Harold E. Trent Co., 618 North 54th St., Philadelphia, Pa.

PLATING MACHINE. A semi-automatic plating machine that produces uniform deposits and provides close production control is described in a folder being mailed by The Udylite Co., 1651 East Grand Blvd., Detroit, Mich.

PLANER. The double-housing "Hy-Draulic" 48x48 in. planer manufactured by Rockford Machine Tool Co., Kishawaukee and 23rd St., Rockford, Ill., is described in folder Form No. DHP-6.

PLASTIC MOLDING. Chicago Molded Products Corp., 2145-53 Walnut St., Chicago, Ill., has published a 40-page booklet, "The Story of Plastic Molding." Contents include an illustrated article on molds and how they are used, an explanation of the factors which determine price, a description of various molding materials, hints on design, and a listing of parts available from stock molds.

PORCELAIN ENAMELS. The Porcelain Enamel Institute, 612 N. Michigan Ave., Chicago, Ill., has published a tentative standard "Test for Acid Resistance of Porcelain Enamels," prepared under the direction of the Institute's committee on test standardization, of which W. N. Harrison of the National Bureau of Standards is chairman. Complete instructions are given under each classification.

PULLEYS AND COUPLINGS. The Congress Tool & Die Co., Inc., 9030 Lumpkin Ave., Detroit, Mich., has published a four-page catalog listing and describing standard pulleys and flexible couplings. Each item listed is diamond bored and balanced.

PUNCH PRESSES. Loshbough-Jordan open-back, inclinable punch presses are described in a folder offered by J. L. Lucas & Son, Inc., 44 Whitehall St., New York.

PYROMETERS. "Celectray" pyrometers, using a photoelectric tube for recording and controlling temperatures, are described in a folder offered by C. J. Tagliabue Mfg. Co., Park & Nostrand Aves., Brooklyn, N. Y.

REAMERS. "Altercut" reamers, available in diameters ranging from ¼ to ½ in., are listed and described in a folder offered by Whitman & Barnes, Detroit, Mich.

REBUILT MACHINERY. Lucas List No. 85, listing and describing rebuilt machinery has been published by J. L. Lucas & Son, Bridgeport, Conn.

RECTIFIERS. Bulletin No. ER-101, published by Hanson-Van Winkle-Munning Co., Matawan, N. J., gives information on the construction, installation and operation of electroplating rectifiers.

SHAPER. The 12-in., high-speed, "Hy-Draulic" shaper manufactured by Rockford Machine Tool Co., Kishawaukee and 23rd St., Rockford, Ill., is illustrated and described in folder Form No. HS-8.

SHEET METAL GUIDE. United States Steel Corp. Subsidiaries, 434 Fifth Ave., Pittsburgh, Pa., are offering "A Guide for Sheet Metal Workers," containing information of

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importance to independent sheet metal fabricators. This booklet presents sales material and tables, as well as fabricating hints, on various sheet products.

SKID PLATFORMS. Various types of skid platforms that may be used in conveying materials by the lift-truck method are illustrated and described in a folder, No. 146, issued by Lewis-Shepard Co., 117 Walnut St., Watertown, Mass.

STAINLESS STEEL. "The Welding of Enduro Stainless Steel" is a 20-page booklet recently published by Republic Steel Corp., Cleveland, Ohio. This booklet describes in detail the proper method for welding stainless steel by electric arc, gas, seam, spot, projection and atomic hydrogen methods. Information on brazing and silver soldering is also included.

STEEL. Union Drawn Steel Co., Massillon, Ohio, is mailing a folder, Form No. 372, in which is discussed the field service available for "trouble shooting" when difficulties develop in fabricating steel parts.

SURFACE GRINDERS. Bulletins offered by Arter Grinding Machine Co., 15 Sagamore Road, Worcester, Mass., describe the Model A and the Model B and C hydraulically-operated rotary surface grinders.

TRADE ASSOCIATIONS. More than 2,400 trade associations of national or interstate scope are listed in "Selected Trade Associations of the United States: 1937 Edition", published by the Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, D. C. Copies may be had at 10 cents each upon application to the Bureau.

TRADE ASSOCIATIONS. Two publications, recently issued by the Trade Association Department of the Chamber of Commerce of the United States, will be of interest to business men. These bulletins carry the following titles: "Development of Trade Association", and "Use of Trade Association Statistics in Manufacturing."

VIBRATION STUDY. Vibration study and other industrial applications of the Neobeam Oscilloscope are discussed in Folder No. 5137, offered by the Sundt Engineering Co., 4238 Lincoln Ave., Chicago, Ill.

VOLTAGE REGULATORS. Bulletins No. 5601 and 5602 illustrate and describe electronic voltage regulators manufactured by Ward Leonard Electric Co., Mount Vernon, N. Y.

VERTICAL MILLER-SHAPER. Bulletin No. 14, issued by Cochrane-Bly Co., 15 St. James St., Rochester, N. Y., illustrates and describes single and duplex universal, vertical shaper-millers and describes various adjustments possible on these machines.

UNIVERSAL DRILL PLATES. A six-page folder published by National Tool & Machine Co., 41-43 Water St., Rochester, N. Y., illustrates and describes universal drilling plates, and "Squar-It" clamping blocks for general tool room work. These toolmaker's aids are claimed to reduce set-up time considerably.

WELDING ELECTRODES. The Electroloy Co., Inc., 50 Church St., New York, has published a leaflet describing cold-formed and plated electrodes for spot welding machines. These improved electrodes are claimed to give an increased number of spot welds per tip.

WIRE SCREEN. Monel wire screen and filter cloth is described in Bulletin No. H-3, recently published by The International Nickel Co., Inc., 67 Wall St., New York, N. Y.

In selecting gages—materials, manufacturing methods and inspection facilities are far more important in judging the maximum amount of work per dollar of gaging cost.

In these three phases of gage manufacture, Taft-Peirce sets its own standards. Selects tool steels as carefully as precious metals. Heat treats them under automatic control. Grinds and laps the gaging members to a mathematically exact surface that does not glitter because there are no scratches to reflect. Then finally—checks and rechecks to hundred-thousandths in a constant-temperature laboratory.

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